Beni-Suef University
Faculty of Science
Zoology Department

جامعة بنى سويف
كلية العلوم
قسم علم الحيوان

Program Specification

Zoology-Chemistry

Undergraduates

2023-2024

برنامج حيوان / كيمياء – قسم علم الحيوان – كلية العلوم – جامعة بنى سويف
العنوان بريدياً: جمهورية مصر العربية محافظة بني سويف - ش صلاح سالم –جامعة بني سويف – كلية العلوم – قسم علم الحيوان (الدور الثالث بالمبنى الرئيسي)
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A-Basic information

Program Title	Zoology / Chemistry
Program Type	Double
Department	Zoology
Coordinator	Prof. Dr. Sanaa Reda Abdel-Aleem
External Evaluator	Prof. Dr. Azza Othman Ismael
Last date of Program Specification Approval:	09/2019
برنامج اللائحة الجديدة بدأ تطبيقه منذ العام الأكاديمي2020/2019م بقرار وزاري رقم 406 بتاريخ 4/2/ 2019م	

B- Professional Information:

1. Overall aims of Program:

This program aims to

1) Recognize the role of basic science that meets community needs and development in a proper language.
2) Demonstrate wide background knowledge related to the different branches of zoology
3) Provide the knowledge and skills related to the use of information technology in data collection, analysis, and presentation data in English and Arabic
4) Provide graduates with skills of safety regulations and quality control processes, managing risk and reporting the results.
5) Gain the graduate the experience to work effectively in a teamwork under different conditions respecting the pre-mentioned rules.
6) Develop the skills to classify or dissect different animals or examine samples or slides expressing and interpreting the resultant scientific data efficiently.
7) Provide the skills and attitude necessary for lifelong and independent learning and participation in lab and research activities effectively.
8) Develop necessary skills to analyze the interactions between living organisms and the environment considering legislations, safety, economic, environmental, social, and ethical needs for preservation of human and organism health and welfare.

2. Intended learning outcomes of Program (ILOs)

The Program provides excellent opportunities for students to demonstrate knowledge and understanding qualities and develop skills appropriate for Bachelor of Sciences in Zoology- Chemistry.

A-Knowledge and Understanding Skills:

On successful completion of this program, the graduate should be able to:

A.1. Define the fundamental procedures and techniques used in zoology and chemistry and the basic science-related fields.

A.2. Outline the basics of Scientific research, management, and language.

A.3. State the different principles, concepts and steps of different chemical and zoological-related methods in basic sciences.

A.4. Describe the structure and function of various types of animal cells, cell organelles, tissues, and systems in unicellular and multicellular organisms.

A.5. List the different terminologies, principles and procedures used in the animal classification and functions of animal systems.

A.6. Memorize the basic knowledge of the principles and procedures used in chemical analyses as well as in characterization and structural investigation of compounds.

A.7. Describe the biological and biochemical functions of different biological molecules illustrating their interactions and roles in different metabolic pathways of the living organisms.

A.8. Recall the main key processes involved in the control of metabolism, including signal transduction and the arrangement, expression, and regulation of genes.

A.9. Mention the knowledge, principles and ethics related to environmental care and community problems.

A.10. Describe the basic knowledge of the molecular biology, including biochemical processes, molecular genetics, and cell biology.

A.11. Identify the principles of thermodynamics including their applications in biological sciences.

A.12. Recognize molecular biology and its implications for cell activity and disease.

B- Intellectual skills:

On successful completion of this program, the graduate should be able to:

B.1. Explain life's basic processes and structures from cell to organism to ecosystem in the light of theories & concepts of different branches in accordance with recent advances in zoology.

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B.2. Evaluate qualitatively and quantitatively the scientific data and other sources of information in graphs, figures, tables, drawings, formula, or diagrams.

B.3. Diagnose the hazard effects of the chemical compounds or pollutants on the living organisms and the environment.

B.4. Interpret various data presented in tables, diagrams, drawings, formula, and graphs and translate them from one form into another.

B.5. Evaluate different aspects, processes, tools, and techniques used in different fields of zoology concerning immunology, physiology, cell biology, molecular biology, genetics, invertebrates, chordates, parasitology, embryology, comparative anatomy, animal behavior ecology and histochemistry.

B.6. Estimate ideas, mechanisms, and methods suitable for solving certain problems related to different fields of zoology and chemistry on critical thinking.

B.7. Analyze various data and information to reach reasonable interpretation and conclusion related to different subjects of chemistry and zoology.

B.8. Interpret physiological, immunological, molecular and histochemical reports.

B.9. Explain different mechanisms for physical and chemical processes.

B.10. Apply the role of various cell signaling mechanisms in regulating cellular functions and growth through combining information and knowledge gained from various disciplines.

B.11. Propose and conclude mechanisms for chemical and biological processes.

B.12. Analyze the output research results to develop new approaches in the modern techniques.

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C- Professional and Practical Skills:

On successful completion of this program, the graduate should be able to:

C.1. Demonstrate the biological, mathematical, chemistry, biochemistry terms, principals of physics and their abbreviations.

C.2. Sequence the terminology of computer science technology and their help in science.

C.3. Apply different information, classic and recent techniques, bioassays, or tools in different fields related to zoology and chemistry.

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C.4. Use quantitative data relevant to the fields of zoology, chemistry and biochemistry in graphs, figures, tables, equations, and other sources of information.

C.5. Apply different procedures and techniques using different laboratory instruments in modeling approaches, taxonomic keys, bioassays, and tools of molecular biology, zoology, and chemistry fields.

C.6. Solve practical scientific problems using practical approaches and techniques.

C.7. Evaluate presentation skills and data introduced and presented by a student on specific chosen topics.

C.8 Evaluate the validity of literature in a critical thinking and solving problems.

C.9. Criticize specific literature reviews or chosen topics.

C.10. Practice skills required for the conduct of standard and recent laboratory recent techniques, bioassays, or tools in different fields of zoology and chemistry e.g., ecology, physiology, immunology, and molecular biology applications.

C.11. Perform practical investigations, dissection, and assays following suitable directions, procedures, and techniques respecting lab rules.

C.12. Solve practical scientific problems using practical approaches and techniques, to carry out field and laboratory analyzes, in a scientific manner, considering moral responsibility.

C.13. Consider the ethical and safety principles in handling and performing different experiments using laboratory animal specimens, chemicals, tools, instruments, and equipment.

C.14. Collect and preserve animal samples and prepare sections for microscopic examination and identification of different types of cells and tissues.

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D-General and Transferable Skills:

On successful completion of this program, the graduate should be able to:

D.1. Illustrate interpersonal skills, manage time, critical enquiry, and self-learning skills, using information and communication technology effectively.

D.2 Address the community linked problems with considerable attention to the community ethics and traditions.

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D.3. Debate the scientific data in Arabic and English

D.4. Apply problem-solving skills, relating to qualitative and quantitative information.

D.5. Investigate the thinking independently, set tasks and solve problems on ethical scientific basis.

D.6. Follow roles, responsibilities, delegate tasks, clear guidelines, and performance indicators.

D.7. Deal with property rights legally and ethically.

D.8. Exhibit the sense of beauty and neatness.

D.9. Work in a team effectively and learn independently with open-mindedness and critical enquiry and enhance self-learning skills.

D.10. Acquire self and lifelong learning.

3. Academic Standards

The Academic Reference Standards for the award of the B.Sc. degree Zoology/Chemistry program as well as the attributes and capabilities of the graduates were based essentially on the National Academic Reference Standards (NARS) published by the National Authority for Quality Assurance and Accreditation of Education (2010/2011) for Zoology/Chemistry as follows:

General Attributes of the Graduates of Basic Sciences Double Programs:

The graduate of any program in basic sciences should be able to:

1) Recognize the role of basic sciences in the development of society.
2) Develop scientific approaches that meet community needs considering economic, environmental, social, ethical, and safety requirements.
3) Utilize scientific facts and theories to analyze and interpret data of various sources.
4) Collect, analyze, and present data using appropriate formats and techniques and use information technology relevant to the field efficiently.
5) Participate effectively as a member in a team, recognize and respect the views and opinions of the other members, and be flexible for adaptation to work conditions.
6) Develop the skills and attitude necessary for lifelong and independent learning and participate effectively in research activities.
7) Deal with scientific data and communicate about specific subjects appropriately in Arabic, English or other languages.

Chemistry / Zoology Program

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In addition to the general attributes of the graduate of faculties of sciences, the graduate of the chemistry / zoology program should be able to:

1) Demonstrate wide integrated knowledge related to different branches of chemistry and zoology.
2) Develop knowledge and experience of working with contemporary laboratory techniques relevant to different disciplines in chemistry and zoology.
3) Plan and conduct experimental work using appropriate instruments, review safety regulations and quality control processes, assess and manage risks, report on practice, and critically evaluate the outcomes.
4) Apply concepts and theories of chemistry to interpret life's basic processes from cell to organism to ecosystems.
5) Recognize the relationship and interactions among chemistry, zoology and the environment.
6) Employ theories and concepts in mathematics and statistics to interpret the underlying mechanisms of the essential processes in chemistry and zoology.
7) Abide by the legislations and ethics related to the environment preservation and human health and welfare.

A. Knowledge and Understanding

1) Demonstrate wide knowledge and comprehension of the theories, facts, concepts, fundamentals, and techniques related to the fields of chemistry and zoology.
2) Acquire the essential knowledge in mathematics, physics, biology, and other collateral subjects to understand the recent advances in chemistry and zoology.
3) Exhibit knowledge of the principles and procedures used in chemical analyses as well as in characterization and structural investigation of compounds.
4) Demonstrate familiarity and comprehension of terminology, nomenclature and contemporary tools used for the classification systems of animals.
5) Acquire knowledge an understanding of the structure and function of various types of animal cells and cell organelles in unicellular and multi- cellular organisms.
6) Demonstrate a profound understanding of how the chemistry of biological molecules determines their biological functions with a special consideration to the major metabolic pathways and their interactions in living organisms.
7) Appreciate the concepts of biodiversity and maintaining of natural resources.

B. Intellectual Skills

1) Test, evaluate and criticize an existing piece of information in the light of evidence provided by recent advances in zoology.
2) Analyze, evaluate, and interpret qualitative and quantitative scientific data relevant to various subjects of chemistry and zoology.

3) Construct several lines of related information to confirm, make evidence and test hypotheses related to recent progresses in research such as stem cell and applications of nanotechnology in biology.
4) Breakdown, synthesize, reconstruct, and reformulate a bulk of information such as pathways for biosynthesis of biologically active compounds or macromolecules.
5) Analyze and interpret quantitative data in graphs, figures, tables and other sources of information.
6) Postulate and deduce mechanisms and procedures to deal with scientific problems relevant to advanced approaches in zoology and chemistry.
7) Link and integrate subject-specific theories, concepts and principles such as relationship between genes and their products, interactions and modulation of the actions of different types of physiological regulators in animals.
8) Combine knowledge gained from different sources to postulate the role of various cell signaling mechanisms in regulating cellular functions and growth.

C. Practical and Professional Skills

1) Plan, and conduct investigations using appropriate procedures and techniques. Write structural reports on the data in accordance with the standard scientific guidelines.
2) Use contemporary laboratory equipment, instruments, and tools efficiently in a safe, ethical, and responsible manner to investigate living organisms and biological systems.
3) Solve problems using a range of formats and approaches.
4) Handle chemical materials and biological samples safely taking into consideration their physical and chemical properties to avoid hazards associated with their use.
5) Employ appropriate statistical and computational tools to analyze and interpret experimental data in terms of theories relevant to chemistry and zoology.
6) Search and evaluate the validity, credibility, and relevance of literature in a critical thinking approach.
7) Consider variations inherent in dealing with biological materials such as sample size, accuracy, precision, and calibration.
8) Employ contemporary information retrieval, modeling approaches, taxonomic keys, bioassays, and tools of molecular biology.
9) Collect and preserve animal samples and prepare sections for microscopic examination and identification of different types of cells and tissues.

D. General Skills

1) Use information and communication technology effectively.
2) Identify roles and responsibilities, delegate tasks, and set clear guidelines and performance indicators.
3) Think independently and solve problems on scientific basis.

4) Work in a team effectively, manage time, collaborate, and communicate with others positively.
5) Address the community linked problems with considerable attention to the community ethics and traditions.
6) Acquire self- and life-long learning.
7) Deal with property rights legally and ethically.
8) Exhibit the sense of beauty and neatness.

4. External references for standard (Benchmark):

Not applied

5. Curriculum Structure and Contents

Program duration is completed after 136 credit hours.

Program	Academic bylaw
➢ **Starting date**	September 2019 till now
➢ **Program duration**	4 years

Item	Humanity Science Courses	Computer Science Courses	Basic Science Courses	Research & Graduation Projects	Specialty Courses		Total
					Zoology Courses	Chemistry Courses	
Compulsory Courses	2	4	16	1	12	16	51
Selective Courses	2	0	0	0	7	6	15
Total Credit Hours	8	8	36	2	40	42	136
(%)	5.88 %	5.88%	26.47%	1.47%	29.42%	30.88%	100%

Summer Training:

- ✓ The students of Zoology/Chemistry program should spend about four weeks.
- ✓ This training is held during the summer break between the third and fourth academic years.

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5.1. Program Courses:
First Level (2019-2020)

First semester									
Code	Course Name	Course Status	Prerequisites	Distribution of Credit hours				Notes	Total credit hours
				Theory	Practical	Training	Credit Hours		
1001-001	English Language	Compulsory	--------	2	-	-	2		15 Compulsory credit hours 2 Selective credit hours
3121-001	Introduction in Computer Sciences	Compulsory	--------	1	2	-	2		
2201-001	Inorganic Chemistry (1) and Physical (2)	Compulsory	--------	2	2	-	3		
2301-001	General Physics (1)	Compulsory	--------	2	2	-	3		
2111-005	Calculus (1) and Geometry	Compulsory	--------	2	2	-	3		
2201-002	Organic Chemistry (2) and Biochemistry	Selective	--------	1	2	-	2	Select one course	
1001-002	Principles of Administration	Selective	--------	2	-	-	2		
1001-003	Environmental Culture	Selective	--------	2	-	-	2		

Second semester									
Code	Course Name	Course Status	Prerequisites	Distribution of Credit hours				Notes	Total credit hours
				Theory	Practical	Training	Credit Hours		
1001-004	Scientific Thinking & writing	Compulsory	--------	2	-	1	2		13 Compulsory credit hours 4 Selective credit hours
3122-002	Basics of Programming	Compulsory	3121-001	1	2	-	2		
2501-001	Basics of Zoology-1 (Physiology & Histology)	Compulsory	--------	2	2	-	3		
2402-001	General Botany	Compulsory	--------	2	2	-	3		
2602-001	General Geology-1	Compulsory	--------	2	2	-	3		
4502-003	Principles of Ecology	Selective	--------	1	2	-	2	Select (1) course	
4502-004	Desert Ecology	Selective	--------	1	2	-	2		
1002-005	History & Philosophy of Science	Selective	--------	2	-	-	2	Select (1) course	
1002-006	Human Rights & anti-Corruption	Selective	--------	2	-	-	2		

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Second Level (2020-2021)

6.

Third Semester

Code	Course Name	Course Status	Prerequisites	Distribution of Credit hours				Notes	Total credit hours
				Theory	Practical	Training	Credit Hours		
3123-003	**Data analysis & Presentation**	Compulsory	3122-002	2	1	-	2		**14 Compulsory credit hours 4 Selective credit hours**
2203-003	**General and Analytical Chemistry**	Compulsory	2201-001	2	1	-	2		
2303-002	**General Physics (2)**	Compulsory	2301-001	1	2	-	2		
2113-140	**General Math (1)**	Compulsory	2111-005	2	-	1	2		
2403-002	**Introduction to Systematic and Microbiology**	Compulsory	2402-001	1	2	-	2		
4233-058	**Organic Chemistry (2)**	Compulsory	--------	2	1	-	2		
4213-005	**Chemistry of Electrolytic Solutions**	Compulsory	--------	2	1	-	2		
4503-005	**Genetics**	Selective	2502-001	2	1	-	2	**Select (1) course**	
4503-006	**Biotechnology**	Selective	2502-001	2	1	-	2		
4243-011	**Aromatic Chemistry**	Selective	--------	1	2	-	2	**Select (1) course**	
4243-012	**Chemistry of Buffered Solutions**	Selective	--------	1	2	-	2		

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Fourth Semester

Code	Course Name	Course Status	Prerequisites	Distribution of Credit hours				Notes	Total credit hours
				Theory	Practical	Training	Credit Hours		
3123-003	**Development of Web sites**	Compulsory		2	1	-	2		**12 Compulsory credit hours 4 Selective credit hours**
2303-003	**General Physics (3)**	Compulsory		2	1	-	2		
2114-141	**General Math (3)**	Compulsory		1	2	-	2		
2504-002	**Basics of Zoology (2) (Invertebrates & Vertebrates)**	Compulsory	2502-001	2	-	1	2		
4504-007	**Cell Biology**	Compulsory	2502-001	1	2	-	2		
4233-058	**General Chemistry (3)**	Compulsory		2	1	-	2		
4504-008	**Basics of Immunology**	Selective		2	1	-	2	**Select (1) course**	
4504-009	**Immunity against Infectious Diseases**	Selective		2	1	-	2		
4503-006	**Drug Chemistry**	Selective	2502-001	2	1	-	2	**Select (1) course**	
4243-011	**Dyes Chemistry**	Selective	--------	1	2	-	2		

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Fifth Semester

Code	Course Name	Course Status	Prerequisites	Distribution of Credit hours				Notes	Total credit hours
				Theory	Practical	Training	Credit Hours		
2605-002	General Geology-2	Compulsory	2602-001	1	2	0	2	-------	12 Compulsory credit hours 4 Selective credit hours
4225-061	Chemistry of Transitional Elements	Compulsory	-------	2	1	0	2	-------	
4215-016	Thermodynamics	Compulsory	-------	1	2	0	2	-------	
4215-062	Structure chemistry and molecular spectrometry	Compulsory	-------	2	0	1	2	-------	
4505-010	Molecular Cell Biology	Compulsory	2502-007	2	0	0	2	-------	
4505-011	Physiology (1)	Compulsory	2502-001	2	1	0	2	-------	
4505-012	Vertebrates	Selective	2504-002	2	1	0	2	Select (1) course	
4505-013	Chordates	Selective	2504-002	2	1	0	2		
4235-026	Instrumental Analysis	Selective	-------	1	2	0	2	Select (1) course	
4235-063	Chromatography Analysis	Selective	-------	1	2	0	2		

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Sixth Semester

Code	Course Name	Course Status	Prerequisites	Distribution of Credit hours				Notes	Total credit hours
				Theory	Practical	Training	Credit Hours		
4505-014	**Invertebrates (1)**	Compulsory	2504-002	2	3	0	3	-------	**12 Compulsory credit hours 4 Selective credit hours**
4505-015	**Comparative Anatomy**	Compulsory	4505-012	2	1	0	2	-------	
4505-016	**Physiology (2)**	Compulsory	2502-001	2	1	0	2	-------	
4245-010	**Organic Physical Chemistry**	Compulsory	-------	1	2	0	2	-------	
4215-015	**Kinetic Chemistry for Chemical Reactions**	Compulsory	-------	1	2	0	2	-------	
4245-037	**Organic Heterochemistry**	Compulsory	-------	1	2	0	2	-------	
4505-017	**Parasitology**	Selective	-------	2	1	0	2	**Select (1) course**	
4505-018	**Invertebrates (2)**	Selective	-------	2	1	0	2		
4245-044	**Chemistry of Natural Products**	Selective	-------	1	2	0	2	**Select (1) course**	
4245-064	**Chemistry of Colored Materials**	Selective	-------	1	2	0	2		

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Seventh Semester

Code	Course Name	Course Status	Prerequisites	Distribution of Credit hours				Notes	Total credit hours
				Theory	Practical	Training	Credit Hours		
4507-019	**Graduation Project**	Compulsory		1	0	2	2	-------	**15 Compulsory credit hours 4 Selective credit hours**
4247-045	**Applied Spectroscopy**	Compulsory		1	2	0	2	-------	
4217-065	**Electrical Chemistry**	Compulsory		1	2	0	2	-------	
4247-023	**Natural Polymers**	Compulsory		1	2	0	2	-------	
4507-020	**Immunity of Infectious Diseases and Advanced Immunology**	Compulsory		3	0	1	3	-------	
4505-020	**Physiology (3)**	Compulsory		2	1	0	2	-------	
4505-021	**Embryology**	Compulsory	4506-015	2	1	0	2		
4505-022	**Parasitology (1)**	Selective	4506-014	2	1	0	2	**Select (1) course**	
4505-023	**Invertebrates (2)**	Selective	4506-014	2	1	0	2		
4247-027	**Cyclic and polycyclic organic chemistry**	Selective		1	2	0	2	**Select (1) course**	
4247-021	**organometallic chemistry**	Selective		1	2	0	2		

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Eighth Semester									
Code	Course Name	Course Status	Prerequisites	Distribution of Credit hours				Notes	Total credit hours
				Theory	Practical	Training	Credit Hours		
4228-057	Radio & Nuclear Chemistry	Compulsory		1	2	0	2	-------	15 Compulsory credit hours 4 Selective credit hours
4218-032	Chemistry of Physical Polymers	Compulsory		1	2	0	2	-------	
4218-035	Kinetics of Organic Reactions	Compulsory		1	2	0	2	-------	
4508-025	Histochemistry	Compulsory		2	1	0	2	-------	
4508-026	Physiology (4)	Compulsory	2502-001	2	1	0	2	-------	
4508-027	Molecular Biology	Compulsory	4505-010	2	1	0	2	-------	
4508-028	Parasitology (2)	Compulsory	4506-014	2	1	0	2	Select (1) course	
4508-029	Invertebrates (3)	Selective	4506-014	2	1	0	2		
4248-066	Pesticide Chemistry	Selective		1	2	0	2	Select (1) course	
4218-040	Thermoanalysis	Selective		2	0	1	2		

6. Program Admission Requirements

Registration to the Faculty of Science requires the student to have the General Egyptian Secondary Education in Science Group Certificate or equivalent certificates or degrees approved by the Egyptian ministry of higher education with qualifying grades according to the guidelines put annually by the Ministry of Higher Education.

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7- Regulations for progression and program completion

Rules related to course outlines are applied, along the 140 credit hours.

7.1. Students must apply for and attend a minimum of six-weeks summer practical training in fields or laboratories of related companies: this should be proven by an official letter from the place of training. For some departments, this training may be done in the faculty facilities.

7.2. The program is completed by at least two scientific fieldtrips, on which a scientific descriptive report must be submitted by each student.

7.3. Every student must attend, at least, 75 % of practical sections, which measured by attendance sheet and student log notebook that marked by administrator staffs.

7.4. Students must have a grade of 60% (1.0 GPA) or higher to pass each course. If the student fails a course (< 1.0 GPA), he/she must retake the course.

7.5. A student successfully completes the program only if he/she had accumulative grade of at least 60% (1.0 accumulate GPA).

7. Assessment of program intended learning outcomes

8.1.Student assessment: Every student must attend, at least, 75 % of practical sections, which measured by attendance sheet and student log notebook that marked by administrator staffs. Every course will be assessed for a weight of 100

No	Tool or method	Tools	Time (no. of weeks/ Academic Year)	wt
1	Written	Knowledge and understanding and Intellectual skills	Every 2 weeks	10%
2	Practical	Practical and professional skills	5th Week	10%
3	Mid-term	Knowledge and understanding and Intellectual skills	6th Week	10%
4	Applied Activities	General and transferable skills	Every 3 weeks	10%
5	Final Exam	Knowledge and understanding and Intellectual skills	13th week	60%

Method of Assessment	Course with Theory Part Only	Course with Theory & Practical	Course with Practical Part Only
Final Written exam	60	60	------
Oral exam	10	10	10
Mid-term	15	5	15
Applied Activities	15	5	15
Final Practical Exam	----	20	60
Total Marks	100	100	100

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Evaluation will be:

(A) **Theoretical course only:**

- 40% weightage (Mid- term exam in the 6th week & student activity throughout the term).
- 60% weightage (semester end written examination).

(B) **Laboratory course only:**

- 40% weightage (Perform the of laboratory exercises and student activity throughout the term).
- 60% weightage (semester end laboratory examination).

Theoretical & laboratory courses:

- 30% weightage (Perform the laboratory exercises throughout the term and semester end laboratory examination)
- 10% weightage (Mid- term exam in the 6th week & student activity throughout the term).
- 60% weightage (semester end written examination)

8. Methods of Program Evaluation:

No	Evaluator	Tools	sample
1	Senior students	Questionnaire and open discussion	50%
2	Alumni	Meeting and Questionnaire	50%
3	Stakeholders	Meeting and Questionnaire	Approximate sample
4	External evaluator(s)	Test reviews	All participants in the program
5	Others	Personal interview	All participants in the program

Program Coordinator — Prof. Dr. Sanaa Reda Abdel-Aleem

Head of Department — Prof. Dr. Abdel-Azeem Shaban Abdel-Baq

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Program Intented Learing Outcomes (ILOs)

Level	semester #	Course Code	Course name	Cr. Hours	Status	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
						A-Knowledges & Understanding												B- Intellectual Skills												C- Professional and Practical Skills														D-General and Transferable Skills									
1st Level	1st Level	1001-001	English	2	C		X																													X								X							X	X	
		3121-001	Introduction to computer sciences	2	C	X																									X													X								X	
		2201-001	Inorganic (1) and physical chemistry (2)	3	C	X		X			X					X			X		X									X																						X	
		2301-001	General Physics (1)	3	C	X										X			X		X									X																						X	
		2111-005	Calculus (1) and Analytical Geometry	3	C	X													X		X									X																						X	
		2201-002	Organic chemistry(1)and biochemistry	2	C	X		X				X	X	X									X							X			X					X		X												X	
		1001-002	Administration principals	2	E		X																																													X	
		1001-003	Environmental culture	2	E	X				X		X	X	X				X		X	X		X	X		X					X					X	X	X						X	X	X	X	X	X				X
	2nd semester	1002-004	Scientific Thinking & writing	2	C			X						X					X		X		X	X					X								X	X	X					X			X	X		X	X	X	
		3122-002	Basics of Programming	2	C		X												X												X				X	X								X			X		X	X			X
		2501-001	Basics of Zoology-1 (Physiology & Histology)	3	C	X			X			X	X					X				X		X										X		X				X	X	X	X	X				X	X			X	
		2402-001	General Botany	3	C	X																						X		X				X						X				X							X	X	
		2602-001	General Geology-1	3	C	X													X		X														X	X			X				X			X	X				X	
		4502-003	Principes of Ecology	2	E	X		X		X	X			X				X		X	X	X	X	X				X	X			X	X	X	X	X	X	X		X	X			X	X			X	X	X	X	X	
		4502-004	Desert Ecology	2	E	X		X	X	X	X			X				X	X	X			X	X					X			X	X	X	X	X	X	X		X				X	X		X	X				X	
		1002-005	History & Philosophy of Science	2	E	X															X								X							X		X						X			X	X					X
		1002-006	Human Rights & anti-Corruption	2	E		X							X							X								X							X		X						X			X			X		X	
2nd Level	3rd Semester	3123-003	Data analysis & Presentation	2	C	X													X		X								X	X	X													X		X	X					X	
		2203-003	Analytical and Physical Chemistry (2)	2	C	X		X			X										X			X		X				X									X			X		X		X	X					X	
		2303-002	General Physics (2)	2	C	X													X		X					X				X														X			X					X	
		2113-140	General Math (2)	2	C	X													X		X									X														X			X					X	
		2403-002	Introduction to Systematic & Microbiology	2	C	X			X									X																										X		X	X					X	
		4233-058	Organic Chemistry (2)	2	C	X		X			X													X		X		X		X		X	X	X					X			X		X			X					X	
		4213-005	Chemistry of Electrolytic Solutions	2	C	X		X			X												X	X				X		X		X	X	X					X			X		X			X					X	
		4503-005	Genetics	2	E	X		X							X			X				X										X										X		X								X	
		4503-006	Biotechnology	2	E	X		X													X													X					X			X		X								X	
		4243-011	Aromatic Chemistry	2	E	X		X			X				X						X							X		X		X	X	X					X			X		X								X	
		4223-012	Chemistry of Buffered Solutions	2	E	X		X			X				X													X		X		X	X	X					X					X								X	
	4th semester	3124-004	Web Development	2	C	X															X									X	X													X								X	
		2304-003	General Physics (3)	2	C	X													X											X														X								X	
		2114-141	General Math (2)	2	C		X												X		X									X	X													X							X	X	
		2504-002	Basics of Zoology (2) (Invertebrates & Vertebrates)	2	C					X								X				X														X								X								X	
		4504-007	Cell Biology	2	C				X									X				X								X						X							X	X					X		X	X	
		4233-058	General Chemistry (3)	2	C	X					X									X										X														X								X	
		4504-008	Basics of Immunology	2	E	X			X										X			X										X							X	X		X		X					X			X	
		4504-009	Immunity against Infectious Diseases	2	E	X			X						X		X		X			X										X							X	X		X			X				X			X	
		4244-060	Medicinal chemistry	2	E						X	X								X				X									X	X						X				X								X	
		4244-014	Chemistry of Dyes	2	E						X												X											X										X								X	
	emester	2605-002	General Geology-2	2	C									X														X		X	X			X														X			X	
		4225-061	Chemistry of Transitional Elements	2	C	X		X			X									X				X				X		X	X										X									X			X	
		4215-016	Thermodynamics	2	C			X								X																										X								X			X	
		4215-062	Structure chemistry and molecular spectrometry	2	C	X		X																	X																								X			X	
		4505-010	Molecular Cell Biology	2	C							X	X		X							X					X					X							X										X			X	
		4505-011	Physiology (1)	2	C	X		X				X	X																			X	X	X					X			X							X			X	

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						A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
3rd Level	5th	4505-013	Chordates	2	E			x	x	x								x			x	x												x						x		x							x		x	X	
		4235-026	Instrumental Analysis	2	E						x													x								x		x								x							x			X	
		4235-063	Chromatography Analysis	2	E						x																					x		x															x			X	
	6th semester	4505-014	Invertebrates (1)	3	C	x			x	x								x	x		x	x								x				x		x			x	x		x		x		x		x				X	
		4505-015	Comparative Anatomy	2	C			x	x	x								x			x	x		x						x				x		x						x		x					x		x	X	
		4505-016	Physiology (2)	2	C			x	x			x	x								x	x		x	x			x				x		x	x	x		x			x	x		x				x	x			X	
		4245-010	Organic Physical Chemistry	2	C			x			x								x		x			x		x						x	x	x								x		x		x						X	
		4215-015	Kinetic Chemistry for Chemical Reactions	2	C						x										x							x				x	x		x									x		x	x					X	
		4245-037	Organic Heterochemistry	2	C			x			x													x		x						x			x						x			x								X	
		4505-017	Parasitology	2	E			x	x	x								x			x	x		x										x	x			x	x			x		x							x	X	
		4505-018	Invertebrates (2)	2	E				x	x											x	x	x										x	x				x	x					x					x				X
		4245-044	Chemistry of Natural Products	2	E			x			x																	x		x				x					x					x								X	
		4245-064	Chemistry of Coloured Materials	2	E						x													x								x												x		x	x					X	

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						A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
4th Level	7th semester	4507-019	Graduation Project	2	C																X	X	X	X					X							X	X	X						X		X			X	X	X	X	
		4247-045	Applied Molecular Spectrochemistry	2	C	X					X					X			X		X			X									X	X	X				X						X		X	X					X
		4217-065	Electrical Chemistry	2	C	X					X					X							X	X		X						X		X	X				X					X								X	
		4247-023	Natural Polymers	2	C	X		X															X					X				X		X					X							X							X
		4507-020	Immunity of Infectious Diseases and Advanced Immunology	3	C							X			X		X				X	X			X		X		X					X					X		X							X				X	
		4507-021	Physiology (3)	2	C	X		X				X	X		X			X				X						X				X		X		X			X									X	X		X		X
		4507-022	Embryology	2	C	X		X											X	X	X	X		X			X	X											X			X		X		X		X		X	X		X
		4507-023	Parasitology (1)	2	E	X		X	X	X					X			X			X	X		X									X			X								X		X					X		X
		4507-024	Invertebrates (2)	2	E	X			X									X			X			X					X	X	X	X				X			X	X	X			X	X	X					X		X
		4247-027	Cyclic and polycyclic organic chemistry	2	E	X		X															X	X				X				X		X														X				X	
		4247-021	organometallic chemistry	2	E						X										X		X			X													X					X						X		X	
	8th semester	4228-057	Radio & Nuclear Chemistry	2	C						X													X									X					X				X			X								X
		4218-032	Chemistry of Physical Polymers	2	C						X													X						X		X			X												X					X	
		4218-035	Kinetics of Organic Reactions	2	C			X			X										X		X			X								X					X										X			X	
		4508-025	Histochemistry	2	C	X		X														X		X					X				X						X		X		X	X		X			X			X	
		4508-026	Physiology (4)	2	C							X	X									X			X		X	X											X	X	X	X		X	X	X		X	X			X	
		4508-027	Molecular Biology	2	C								X		X		X			X		X		X	X		X	X				X	X	X					X			X			X				X			X	
		4508-028	Parasitology (2)	2	E				X	X							X	X				X		X				X						X					X		X	X		x	X							X	
		4508-029	Invertebrates (3)	2	E				X	X								X				X												X							X	X			X					X		X	
		4248-066	Pesticide Chemistry	2	E	X		X			X			X						X				X			X			X		X			X											X	X					X	
		4218-040	Thermoanalysis	2	E						X					X								X		X							X			X										X	X					X	

Beni-Suef University
Faculty of Science
Zoology Department

جامعة بنى سويف
كلية العلوم
قسم علم الحيوان

مصفوفة التوافق بين المعايير الأكاديمية القومية المرجعية ونواتج التعلم المستهدفة من البرنامج		
A-Knowledge and understanding		
NARS (7)	**Program ILOS (12)**	**Couse code**
1. Demonstrate wide knowledge and comprehension of the theories, facts, concepts, fundamentals and techniques related to the fields of chemistry and zoology.	A.1.Define the fundamental procedures and techniques used in zoology and chemistry and the basic science related fields. A.2. Outline the basics of scientific research, administration, accounting, management, language, and human rights.	2201-001; 1002-005; 2402-001; 2501-001 1001-003; 2201-002; 3122-002; 3122-002 1001-001; 3121-001; 1001-002; 1002-004 2602-001; 4502-003; 3123-003; 2203-003 2303-002; 2113-140; 4233-058; 3124004 2114-141; 4215-016; 4215-062; 4505-010; 4505-012; 4505-013; 4507-019; 4248-066 4248-066
2. Acquire the essential knowledge in mathematics, physics, biology and other collateral subjects in order to understand the recent advances in chemistry and zoology.	A.3. State the different principles, concepts and steps of different chemical and zoological-related methods in basic sciences	4502-004;2304-003;2504-002; 4504-009;4505-012; 4506-014;4506-017; 4506-018;4507-023; 4508-028;4508-028; 4508-029; 4248-066
3.Exhibit knowledge of the principles and procedures used in chemical analyses as well as in characterization and structural investigation of compounds.	A.11.Identify the principles of thermodynamics including their applications in biological sciences.	2201-002; 2501-001; 2403-002; 4213-005; 4503-005; 4243-011; 4223-012; 4504-007; 4224-051; 4504-008; 4504-009; 4225-002; 4506-014; 5406-015; 4506-016; 4245-010; 4506-017; 4506-018; 4245-044; 4507-024; 4508-025; 4247-023; 4507-021; 4507-022; 4507-023; 4247-021; 4508-029
4. Demonstrate familiarity and comprehension of terminology, nomenclature and contemporary tools used for the classification systems of animals.	A.5. List the different terminologies, principles and procedures used in the animal classification and functions of animal systems.	4503-005; 4243-011; 4223-012; 4505- 010; 4235-026; 4235-063; 4215-015; 4245-044
5. Acquire knowledge an understanding of the structure and function of various types of animal cells and cell organelles in unicellular and multicellular organisms.	A.4. Describe the structure and function of various types of animal cells, cell organelles, tissues, and systems in unicellular and multicellular organism	2201-001; 2201-002; 4502-004; 2203-003; 4233-058; 4243-011; 4223-012; 4224-051; 4244-060; 4244-014; 4245-010; 4218-035; 4248-066

.6. Demonstrate a profound understanding of how the chemistry of biological molecules determines their biological functions with a special consideration to the major metabolic pathways and their interactions in living organisms.	A.7. Describe the biological and biochemical functions of different biological molecules illustrating their interactions and roles in different metabolic pathways of the living organisms. A.8. Recall the main key processes involved in the control of metabolism, including signal transduction and the arrangement, expression, and regulation of genes. A.9. Mention the knowledge, principles and ethics related to environmental care and community problems. A.10. Describe the basic knowledge of the molecular biology, including biochemical processes, molecular genetics, and cell biology. A.12. Recognize molecular biology and its implications for cell activity and disease.	4245-037; 4247-045; 4217- 065; 4507-020; 4228-057; 4218-032; 4507-021; 4218- 040; 4244-060; 2201-002; 2501-001; 4505-010; 4507- 021; 507-024; 4247-021
7. Appreciate the concepts of bio-diversity and maintaining of natural resources.	A.6. Memorize the basic knowledge of the principles and procedures used in chemical analyses as well as in characterization and structural investigation of compounds.	4506-016; 4244-060; 4507- 020; 4502-004; 4502- 003; 1001-003; 1002- 004; 2501-001; 1002- 006; 2201-001; 2301- 001; 2113-140; 4215-016; 4505-010; 4507-021; 4508-027
B- Intellectual skills		
NARS (8)	**Program ILOS (12)**	**Couse code**
1. Test, evaluate and criticize an existing piece of information in the light of evidence provided by recent advances in zoology.	B.1. Explain life's basic processes and structures from cell to organism to ecosystem in the light of theories & concepts of different branches in accordance with recent advances in zoology	2501-001; 2402-001; 4502-003; 2602-001; 4502-004; 2403-002; 2504-002 4504-007; 4506-014; 4506-017; 4507-021 4507-023; 4507-024; 4508-028; 4508-029 4248-066
2. Analyze, evaluate and interpret qualitative and quantitative scientific data	B.7. Analyze various data and information to reach reasonable interpretation and	2201-001; 2402-001; 1002- 005; 002-006; 4503-006; 4245-010

relevant to various subjects of chemistry and zoology.	conclusion related to different subjects of chemistry and zoology	
3. Construct several lines of related information to confirm, make evidence and test hypotheses related to recent progresses in research such as stem cell and applications of nano-technology in biology.	B.3. Diagnose the hazard effects of the chemical compounds or pollutants on the living organisms and the environment. B.12. Analyze the output research results to develop new approaches in the modern techniques.	2301-001; 1002-004; 3122-002; 2602-001 4502-003; 4502-004; 1001-003; 4502-004; 1001-003; 2201-001; 3123-003; 2303- 002; 2113-140: 2403-002; 2304-003; 2114-141; 4224-051; 4504-008; 4244-060; 4245-010; 4215-015; 4245-064; 4218-032; 4507-019; 4247-045; 4507-023; 4508-025
4. Breakdown, synthesize, reconstruct and reformulate a bulk of information such as pathways for biosynthesis of biologically active compounds or macromolecules.	B.10. Apply the role of various cell signaling mechanisms in regulating cellular functions and growth through combining information and knowledge gained from various disciplines.	1002-004; 4502-003; 4244-014; 2501-001; 3124- 004; 4504-008; 4506-016; 4508-027; 4247-023; 4507-020; 4247-021; 4507-021
5. Analyze and interpret quantitative data in graphs, figures, tables and other sources of information.	B.2. Evaluate qualitatively and quantitatively the scientific data and other sources of information in graphs, figures, tables, drawings, formula, or diagrams.	4506-016; 2501-001; 1002-004; 4502- 004; 2403-002; 4503-005; 2504-002; 4504-007; 4504-008; 4504-009; 4244- 060; 4218-040; 4508-029; 4507-023; 4228-057, 4218-032; 4508-025; 4507- 021; 4508-027; 4506-017; 4505-010; 4235-026; 4506-014; 5406-015; 4245- 037; 4506-018; 4507-019; 4247-045; 4217-065; 4507-020; 4507-021; 4507- 022; 4247-021; 4508-028
6. Postulate and deduce mechanisms and procedures to deal with scientific problems relevant to advanced approaches in zoology and chemistry.	B.6. Estimate ideas, mechanisms, and methods suitable for solving certain problems. Related to different fields of zoology and chemistry on critical thinking. B.8. Interpret physiological, immunological, molecular, and histochemical reports. B.9. Explain different mechanisms for physical and chemical processes. B.11. Propose and conclude mechanisms for chemical and biological processes.	4502-004; 2402-001; 2501-001; 2203- 003; 2303-002; 4233-058; 4213-005; 4243-011; 4223-012; 4215-062; 4506- 016; 4245-010; 4215-015; 4245-037; 4245-044; 4218-040; 4508-027; 4507-021; 4218-035; 4507-019; 4217-065; 4247- 023; 4507-022; 4247-021; 4508-028; 4248-066

7. Link and integrate subject-specific theories, concepts and principles such as relationship between genes and their products, interactions and modulation of the actions of different types of physiological regulators in animals.	B.5. Evaluate different aspects, processes, tools, and techniques used in different fields of zoology concerning immunology, physiology, cell biology, molecular biology, genetics, invertebrates, chordates, parasitology, embryology, comparative anatomy, animal behavior, ecology, histochemistry.	2111-005; 5406-015; 4507- 021; 4507-019; 4506-016; 2501-001; 2203-003; 4233-058; 4213-005; 4243-011; 4506-014; 4506- 018; 4247—045; 4507-020; 4507-022; 4507-024; 4247- 021; 4508-028
8. Combine knowledge gained from different sources to postulate the role of various cell signaling mechanisms in regulating cellular functions and growth.	B.4. Interpret various data presented in tables, diagrams, drawings, formula, and graphs and translate them from one form into another	1001-003;2501-001; 2602-001; 4502-003; 1002-005; 1002-006; 502-004; 3123- 003;2203-003; 4233- 058; 4508-027; 4507-019; 4507-020; 4507-021; 4507-022; 4507-024; 4508-025; 4248-066

C- Practical and Professional Skills

NARS (9)	Program ILOS (14)	Couse code
1. Plan, and conduct investigations using appropriate procedures and techniques.	C.3. Apply different information, classic and recent techniques, bioassays, or tools in different fields related to zoology and chemistry. C.4. Use quantitative data relevant to the fields of zoology, chemistry and biochemistry in graphs, figures, tables, equations, and other sources of information.	4243-011; 4504-008; 4502-004; 4506-018 2201-002; 4245-010; 4247-023; 4228-057 2402-001: 2501-001; 4504-009; 4507-023 4248-066
2. Use contemporary laboratory equipment, instruments, and tools efficiently in a safe, ethical and responsible manner to investigate living organisms and biological systems.	C.1.Demonstrate the biological, mathematical, chemistry, biochemistry terms, principals of physics and their abbreviations. C.2. Sequence the terminology of computer science technology and their help in science. C.12. Solve practical scientific problems using practical approaches and techniques, to	2201-001; 2402-001; 4502-003 ; 4245-044; 4507-020; 4507-024; 4218-032; 4507-021; 4248-066; 2111-005; 1002-005; 1002-006; 4502-004; 2201-002; 1002-004 ; 2602-001; 3122-002; 2301- 001; 3121-001; 3123-003; 2203-003; 2303-002; 2113- 140; 4233-058; 4213-005; 4504-009; 4223-012; 3124-004; 2304-003; 2114-141; 4224-051; 4215-016; 4505-013; 4506-014; 5406-015; 4506-017.

	carry out field and laboratory analyzes, in a scientific manner, considering moral responsibility C.13. Consider the ethical and safety principles in handling and performing different experiments using laboratory animal specimens, chemicals, tools, instruments, and equipment	
3. Solve problems using a range of formats and approaches.	C.6. Solve practical scientific problems using practical approaches and techniques.	4245-037; 2203-003; 4233-058; 4233-058; 4213-005; 4503-006; 4243-011; 4223-012; 4504-008; 4504-009; 4504-009; 4506-014; 4506-017; 4506-018; 4245-044; 4245-064; 4507-021; 4508-027; 4507-020; 4507-021; 4507-022; 4507-024; 4247-021; 4508-025; 4508-028
4. Handle chemical materials and biological samples safely taking into consideration their physical and chemical properties to avoid hazards associated with their use.	C.10. Practice skills required for the conduct of standard and recent laboratory techniques, bioassays, or tools in different fields of zoology and chemistry e.g., ecology, physiology, immunology, and molecular biology applications	2602-001; 1002-006; 2504-002; 4504-007; 4504-008; 4218-040; 4507-024; 4248-066; 4506- 017; 5406-015; 4507-019; 4218-035; 4507-021; 2501-001; 4502-003; 3122-002; 1002-005; 4506-014; 4505-012; 4505-013; 4502-004; 2402-001; 4247—045; 4507-020; 4507-021; 4507- 022; 4507-023; 4507-024; 4508-028; 1002-004
5. Employ appropriate statistical and computational tools to analyze and interpret experimental data in terms of theories relevant to chemistry and zoology.	C.7. Evaluate presentation skills and data introduced and presented by a student on specific chosen topics. C.8 Evaluate the validity of literature in a critical thinking and solving problems.	4233-058; 4213-005; 4223-012; 2504- 002; 4504-009; 4244-060; 4244-014; 4505-010; 4235-026; 4235-063; 4506- 014; 4506-016; 4245-010; 4215-015; 4506-017; 4506-018; 4245-044; 4218- 040; 4508-029; 4247-045; 4508-027; 4217-065; 4507-020; 4507-021; 4507- 024; 4247-021; 4508-025; 4508-028
6. Search and evaluate the validity, credibility, and relevance of literature in a critical thinking approach.	C.9. Criticize specific literature reviews or chosen topics.	1002-004; 1002-006; 4502-003; 1002- 005; 4502-004; 4244-060; 4506-016; 4245-037; 4507-020; 4507-024; 4508-025; 4508-029
7. Consider variations inherent in dealing with biological materials such as sample size, accuracy, precision and calibration.	C.11. Perform practical investigations, dissection, and assays following suitable directions, procedures, and techniques	4506-016; 4506-017; 4506- 018; 4507-019; 4507-024

	respecting lab rules.	
8. Employ contemporary information retrieval, modeling approaches, taxonomic keys, bioassays and tools of molecular biology.	C.5. Apply different procedures and techniques using different laboratory instruments in modeling approaches, taxonomic keys, bioassays, and tools of molecular biology, zoology, and chemistry fields.	4506-016; 4245-037; 4504- 009; 4217-065; 4507- 021; 4228-057; 4218- 032; 2203-003; 4233- 058; 4213-005; 2501- 001; 4503-006; 4243- 011; 4504-008; 4505- 012; 4235-026; 4506- 014; 5406-015; 4245- 010; 4245-010; 4215- 015; 4507-019; 4507- 022; 4508-028; 4508- 029
9. Collect and preserve animal samples and prepare sections for microscopic examination and identification of different types of cells and tissues.	C14. Collect and preserve animal samples and prepare sections for microscopic examination and identification of different types of cells and tissues.	4504-007, 4508-025
D-General and Transferable Skills		
NARS (8)	**Program ILOS (10)**	**Couse code**
1. Use information and communication technology effectively.	D.1. Illustrate interpersonal skills, manage time, critical enquiry, and self-learning skills, using information and communication technology effectively.	2602-001; 1002-005; 001-003; 1002-004 3122-002; 2501-001; 2402-001; 4502-003 4502-004; 4508-027; 4507-020; 4507-023 4507-024; 4247-021; 4228-057; 4508-025 4507-021; 4244-014; 3123-003; 2203-003 2303-002; 2113-140; 2403-002; 4213-005; 4503-005; 4503-006; 4243-011; 4223-012; 3124-004; 2304-003; 2114-141; 2504-002; 4504-007; 4224-051; 4504-008; 4504-009; 4506-014; 5406-015; 4245-010; 4215-015; 4245-037; 4506-017; 4506-018; 4245-044 4245-064; 4507-019; 4247—045; 4507-022
2. Identify roles and responsibilities, delegate tasks, and set clear guidelines and performance indicators.	D.3. Debate the scientific data in Arabic and English. D.6. Follow roles, responsibilities, delegate tasks, clear guidelines, and performance indicators.	3123-003; 2203-003; 2501- 001; 1002-004; 4507-020; 4218-040; 2403-002; 4504-007; 4225-002; 4215-016; 4506-014; 5406- 015; 4245-010; 4215-015; 4245-064; 4247-023; 4507- 022; 4507-023; 4508-025; 4507-021
3. Think independently, and solve problems on scientific basis.	D.4. Apply problem-solving skills, relating to qualitative and quantitative information.	2602-001; 1002-005; 1002- 006; 4502-004; 1002-004; 3122-002; 2501-001; 2402- 001; 4502-003; 3123-003; 2203-003; 2303-002; 2113- 140; 2403-002; 4233-058; 4213-005; 4503-006; 4504- 009; 4506-014; 4506-016;

	D.5. Investigate the thinking independently, set tasks and solve problems on ethical scientific basis	4215-015; 4245-064; 4245- 064; 4218-032; 4507-022; 4247—045; 4507-020; 4507- 021; 4507-024; 4247-021; 4248-066
4. Work in a team effectively, manage time, collaborate and communicate with others positively.	D.9. Work in a team effectively and learn independently with open-mindedness and critical enquiry and enhance self-learning skills.	3121-001; 2201-001; 2301-001; 2111-005; 2201-002; 1001-002; 4502-003; 4502-004; 2203-003; 2303-002; 2113-140; 2403-002; 4233-058; 4213-005; 4503-005; 4503-006; 4223-012; 3124-004; 2304-003; 2114- 141; 2504-002; 4224-051; 4504-008; 4225-002; 215-016; 4215-062; 4247- 021
5. Address the community linked problems with considerable attention to the community ethics and traditions.	D.2 Address the community linked problems with considerable attention to the community ethics and traditions.	3121-001; 2201-001; 2111-005; 4507-022
6. Acquire self- and life-long learning.	D10. Acquire self- and life-long learning.	3122-002; 4215-062; 4505-010; 4505- 012; 4505-013; 4235-026; 4235-063; 5406-015; 4506-016; 4506-018; 4507-019; 4507-021; 4218-035; 4508-027
7. Deal with property rights legally and ethically.	D7. Deal with property rights legally and ethically.	2301-001; 2201-002; 1001-002; 1001-003; 3122-002; 4507-020; 4247-021;
8. Exhibit the sense of beauty and neatness.	D.8.Exhibit the sense of beauty and neatness.	1001-003; 2501-001; 2402-001; 2602- 001; 1002-006; 3123-003; 4503- 005; 4243-011; 2304-003; 214-141; 4504-007; 4504-008; 4504-009; 4244-060; 4244-014; 4505-010; 4505-012; 4505-013; 4235-026; 4235-063; 4506-014; 5406-015; 4506-016; 4245-010; 4215-015; 4245-037; 506-017; 4506-018; 4245-044; 4245-064; 4507-019; 4217-065; 4507-021; 4507-022; 4507-023; 4507-024; 4247-021; 4247-021; 4508-025; 4508-027; 4508-029; 4248-066; 4218-040

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جامعة بنى سويف
كلية العلوم
قسم علم الحيوان

مصفوفة التوافق بين مواصفات الخريج لبرنامج حيوان/كيمياء مع أهداف البرنامج	
General attributes of Graduates	**Program Aims**
1. Recognize the role of basic sciences in the development of society. 2. Develop scientific approaches that meet community needs considering economic, environmental, social, ethical, and safety requirements. 7. Deal with scientific data and communicate about specific subjects appropriately in Arabic, English or other languages.	1. Recognize the role of basic science that meets community needs and development in a proper language.
8. Demonstrate wide integrated knowledge related to different branches of chemistry and zoology. 9. Develop knowledge and experience of working with contemporary laboratory techniques relevant to different disciplines in chemistry and zoology.	2. Demonstrate wide background knowledge related to the different branches of zoology
4. Collect, analyze, and present data using appropriate formats and techniques and use information technology relevant to the field efficiently. 13. Employ theories and concepts in mathematics and statistics to interpret the underlying mechanisms of the essential processes in chemistry and zoology.	3. Provide the knowledge and skills related to the use of information technology in data collection, analysis, and presentation data in English and Arabic.
10. Plan and conduct experimental work using appropriate instruments, review safety regulations and quality control processes, assess and manage risks, report on practice, and critically evaluate the outcomes.	4. Provide graduates with skills of safety regulations and quality control processes, managing risk and reporting the results.

5. Participate effectively as a member in a team, recognize and respect the views and opinions of the other members and be flexible for adaptation. to work conditions.	5. Gain the graduate the experience to work effectively in a teamwork under different conditions respecting the pre-mentioned rules.
12. Recognize the relationship and interactions among chemistry, zoology and the environment.	6. Develop the skills to classify or dissect different animals or examine samples or slides expressing and interpreting the resultant scientific data efficiently
3. Utilize scientific facts and theories to analyze and interpret data of various sources. 6. Develop the skills and attitude necessary for lifelong and independent learning and participate effectively in research activities. 11. Apply concepts and theories of chemistry to interpret life's basic processes from cell to organism to ecosystems.	7. Provide the skills and attitude necessary for lifelong and independent learning and participation in lab and research activities effectively.
14. Abide by the legislations and ethics related to the environment preservation and human health and welfare.	8. Develop necessary skills to analyze the interactions between living organisms and the environment considering legislations, safety, economic, environmental, social, and ethical needs for preservation of human and organism health and welfare.

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