Academic Program Description Form

University Name: Al-Muthanna

Faculty/Institute: .Science of collage

Scientific Department: Biology

Academic or Professional Program Name: .BSc

Final Certificate Name: .BSc in Biology

Academic System: .....

Description Preparation Date: 26\5\2024

File Completion Date:26\5\2024

Signature:

Head of Department Name:

Dr. Hanaa Ali Aziz

Date:26/5/2024

جامعة المثنى
كلية العلوم
مكتب معاون العميد
للشؤون العلمية والدراسات العليا

Signature:

Scientific Associate Name:

أ.م. ميثم عباس مكي

Date: 26/5/2024

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

جامعة المثنى / كلية العلوم
مكتب العميد

Approval of the Dean

Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: **Al Muthanna**
Faculty/Institute: **Science**
Scientific Department: **Biology**
Academic or Professional Program Name: **Bachelor's**
Final Certificate Name: **Bachelor's in Biology**
Academic System: **courses**
Description Preparation Date:
File Completion Date:

Signature:	**Signature**:
Head of Department Name:	**Scientific Associate Name**:
Asst. Prof. Dr. Hanaa Ali Aziz	**Asst. Prof. Maitham Abbas Maki**
Date:	**Date**:**26–5–2024**

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Date:
Signature:

Approval of the Dean

1. Program Vision

Our vision is to establish a leading program in clinical analysis that cultivates a deep understanding of pathological principles and innovations. We aim to foster a learning environment that promotes scientific curiosity, critical thinking, and the application of clinical knowledge to solve real-world health problems.

2. Program Mission

Our mission is to provide a comprehensive education in clinical analysis, equipping students with the knowledge and skills necessary to excel in academic, research, and healthcare settings. We strive to advance the field through cutting-edge research, ethical practices, and the development of innovative solutions to global health challenges.

3. Program Objectives

The objectives of the clinical analysis program are designed to provide students with a comprehensive understanding of clinical laboratory techniques and their applications. These include:

Examination of Urine: Teach the principles of pathological analysis in the laboratory, including urine tests and the use of urine strips for detecting chemical components and urine cultures.

Renal Function Tests: Educate on urine tests and urine strips to evaluate kidney function.

Chemical Components of Urine: Develop skills in performing and interpreting urine culture results.

Liver Function Tests: Provide knowledge on biochemical tests to assess liver function.

Examination of Feces: Train students in stool tests for detecting gastrointestinal diseases.

Semen Analysis: Guide students through semen tests to evaluate male fertility.

Pregnancy Tests: Explain the principles and methods of conducting pregnancy tests.

Blood and Components: Teach about blood sugar levels and the diagnosis of Diabetes Mellitus, including hypoglycemia and hyperglycemia.

Laboratory Tests in Anemia: Instruct on blood smear techniques, Hb, PCV, RBC, and WBC counts for diagnosing various forms of anemia such as aplastic, pernicious, and megaloblastic anemia.

Laboratory Tests in Hematological Malignancies: Train students to perform blood smears and other tests for leukemia patients.

Coagulation Factors and Bleeding Disorders: Educate on tests like ESR, bleeding time, and blood grouping.

Examination of Sputum: Teach the use of acid-fast stains for TB bacteria and sample cultures.

Examination of Cerebrospinal Fluid: Provide skills in using acid-fast stains and cultures for diagnosing infections.

Sexually Transmitted Diseases (STD): Instruct on the collection and culture of swabs for STD testing.

Science Serology: Educate on serological tests for autoimmune diseases, including tests for Rheumatoid Arthritis, C-Reactive Protein (C.R.P), Widal test, Rose Bengal, Antistreptolysin test (A.S.O.T), and the principles of ELISA, PCR, and real-time PCR.

4. Program Accreditation

Yes- Ministry of Higher Education and Scientific Research (Iraq)

5. Other external influences

Ministry of Higher Education and Scientific Research (Iraq)

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements				
Department Requirements	X	3		
Summer Training				
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
Four			**theoretical**	**practical**

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	Understand the fundamental principles of clinical analysis, including the structure and functions of various biological fluids and tissues, and the processes of laboratory testing and analysis.
Skills	
Learning Outcomes 2	**Learning Outcome Statement 2:** Explain the mechanisms of disease detection and diagnosis through laboratory tests, such as urine tests, blood tests, and microbiological cultures, and their significance in clinical decision-making and patient care.
Learning Outcomes 3	**Learning Outcome Statement 3:** Analyze and interpret experimental data relevant to clinical analysis, such as results from biochemical tests, hematological assessments, and serological assays, and apply statistical methods for data analysis to ensure accuracy and reliability.
Ethics	
Learning Outcomes 4	Understand the ethical considerations in clinical analysis, including the responsible handling of patient samples, confidentiality, and the ethical use of diagnostic techniques.
Learning Outcomes 5	Make informed decisions regarding ethical dilemmas in clinical analysis, emphasizing the importance of patient privacy, consent, and responsible reporting of test results.

9. Teaching and Learning Strategies

The program adopts a variety of teaching and learning strategies, including:

- **Active Participation and Interaction:** Encouraging students to participate in lectures, ask questions, and engage in discussions.
- **Active Listening:** Emphasizing attentive listening during explanations and demonstrations.
- **Hands-on Laboratory Sessions:** Providing practical laboratory sessions to apply theoretical knowledge.
- **Case Studies and Practical Workshops:** Incorporating real-world scenarios to enhance problem-solving skills.
- **Communication Skills Training:** Focusing on effective scientific communication, both written and oral.
- **Integration of General and Transferable Skills:** Developing critical thinking, problem-solving, and research skills.
- **Ethical Considerations:** Teaching responsible use of genetic engineering and discussing ethical dilemmas.
- **Staying Updated with Research:** Encouraging students to keep up with the latest advancements in the field.
- **Collaboration and Teamwork:** Promoting group projects and assignments to simulate real-world scientific collaborations.

10. Evaluation methods

- Evaluation methods are implemented at various stages of the program, including:
- Continuous Assessment: Regular quizzes, assignments, and participation.
- Laboratory Reports: Evaluation of practical work and experimental results.
- Examinations: Mid-term and final exams to assess comprehensive understanding.
- Projects and Presentations: Assessing the ability to apply knowledge and communicate findings.
- Peer and Self-Assessment: Encouraging reflective learning and peer feedback.
- Mid exam
- Final exam

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Assistant Professor Dr.	Biology	Molecular biology and biotechnology				

Professional Development

Mentoring new faculty members

- Orientation programs to familiarize them with departmental policies and teaching methodologies.
- Regular meetings with experienced faculty mentors to discuss teaching strategies and research integration.

Professional development of faculty members

The academic and professional development plan includes:

- Workshops on innovative teaching and learning strategies.
- Seminars on the latest research advancements in microbial genetics.
- Opportunities for faculty to attend conferences and participate in collaborative research projects.
- Regular assessments and feedback sessions to enhance teaching effectiveness.

12. Acceptance Criterion

The program follows the central admission regulations set by the university, which include academic qualifications, entrance exams, and interviews.

13. The most important sources of information about the program

- Essentials of Clinical Pathology Book First Edition: 2010 ISBN 978-93-80704-19-7
- Manual of laboratory and Diagnostic Tests. Edition (8) copyright2009 Vol. (1) (2).by Lippincott Williams& wilkins.
- Robbins Pathology Books
- Textbook of Diagnostic Microbiology ISBN: 978-1-4160-6165-6-Fourth Edition.

14. Program Development Plan

The development plan for the Clinical Analysis program involves continuous curriculum review and updates based on the following key elements:

- **Feedback from Students, Faculty, and Industry Partners**: Regularly collect and incorporate feedback from students, faculty, and industry partners to ensure the curriculum remains relevant and meets the needs of all stakeholders.
- **Emerging Trends and Technological Advancements**: Stay abreast of the latest trends and technological advancements in clinical analysis and laboratory medicine to integrate new knowledge and techniques into the curriculum.
- **Accreditation Requirements and Standards**: Adhere to accreditation requirements and

standards set by relevant accrediting bodies to ensure the program maintains high educational and professional standards.

- **Periodic Assessments**: Conduct regular assessments and evaluations of the program to ensure it meets its educational and professional objectives, making adjustments as necessary to improve outcomes and maintain excellence.
-

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Four		Clinical analysis	optional	+	+	+		+	+			+	+		

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name: Clinical analysis
2. Course Code:
3. Semester / Year: First /2024
4. Description Preparation Date: 26-5-2024
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
7. Course administrator's name (mention all, if more than one name)
Name: Asst Prof. Dr. Yasir Adil Jabba Alabdali Email: yasir.alabdali@mu.edu.iq
8. Course Objectives

Course Objectives	• **Provide a Thorough Understanding of the Chemical Basis of Disease: Ensure students comprehend the chemical and biochemical foundations underlying various diseases and pathological conditions.** • **Equip Students with Practical Skills in Laboratory Techniques: Train students in practical skills for collecting and analyzing various biological samples, such as blood, urine, stool, sputum, and cerebrospinal fluid.** • **Explore the Processes of Diagnosis and Monitoring: Educate students on the processes and techniques involved in diagnosing and monitoring diseases, including the use of biochemical tests, urine tests, and hematological assessments.** • **Analyze Genetic and Metabolic Disorders: Investigate genetic and metabolic disorders through laboratory tests, focusing on mutations, repair mechanisms, and methods for detecting genetic abnormalities.** • **Investigate the Mechanisms of Disease Transmission and Detection: Study the mechanisms of disease transmission and detection, including the identification of pathogens through microbiological cultures and serological assays.**

	• **Understand the Regulation of Biological Processes: Provide an understanding of how various biological processes are regulated in health and disease, including the regulation of blood sugar, liver function, and renal function.** • • **Introduce Advanced Diagnostic Techniques: Introduce students to advanced diagnostic techniques, such as molecular diagnostics, including PCR, real-time PCR, and ELISA, for detecting and quantifying specific biomarkers and pathogens.**

9. Teaching and Learning Strategies

Strategy	• **Active Participation and Interaction: Engage students in discussions and interactive lectures to deepen** • **understanding.** • **Hands-on Laboratory Sessions: Facilitate practical experiments to apply theoretical knowledge.** • **Case Studies and Practical Workshops: Provide real-world scenarios to enhance problem-solving skills.** • **Communication Skills Training: Develop written and oral communication skills for scientific contexts.** • **Integration of General and Transferable Skills: Incorporate critical thinking, problem-solving, and research skills** • **into the curriculum.** • **Ethical Considerations: Discuss ethical issues related to genetic research and engineering.** • **Staying Updated with Research: Encourage students to read scientific journals and participate in research activities.** • **Collaboration and Teamwork: Promote group projects and teamwork to simulate scientific collaboration.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Examination of Urine	Principles of Pathological Analysis Laboratory	Lecture and Discussion	Quiz
2	2	Renal Function Tests	Urine test , urine strips	Laboratory Session	Lab Report
3	2	Chemical components of urine	Urine culture	Practical Workshop	Lab Report
4	2	Liver Function Tests	Biochemical Test	Lecture and Discussion	Mid-term Exam
5	2	Examination of Feces	Stool test	Laboratory Session	Lab Report
6	2	Semen Analysis	Semen test	Lecture and Discussion	Quiz
7	2	Pregnancy Tests	Pregnancy Test	Practical Workshop	Assignment
8	2	Blood and components, blood sugar Diabetes Mellitus types and disease (Hypoglycemia and Hyperglycemia)	Blood sugar	Laboratory Session	Lab Report
9	2	Laboratory Tests in Anemia Blood disease Anemia Aplastic anemia	Blood smear such as Hb , PCV, RBC counts and WBC counts	Lecture and Discussion	Quiz

		Pernicious anemia Megaloblastic anemia			
10	2	Laboratory Tests in Hematological Malignancies	Blood smear for Leukemia patients	Lecture and Case Study	Assignment
11	2	Coagulation factors bleeding disorder Erythrocyte Sedimentation Rate	ESR, bleeding time, blood groups	Practical Workshop	Mid-term Exam
12	2	Examination of Sputum	Acid fast stains for TB bacteria and Samples cultures	Lecture and Discussion	Quiz
13	2	Examination of Cerebrospinal Fluid	Acid fast stains for TB bacteria and Samples cultures	Laboratory Session	Lab Report
14	2	Sexually Transmitted Diseases (STD)	Swabs cultures	Lecture and Discussion	Assignment
15	2	Science Serology Serological tests for autoimmune diseases Rheumatoid Arthritis C-Reactive Protein C.R.P Widal test Wrights agglutination test or Rose Bengal Antistreptolysin test (A.S.O.T) ELISA test principal Poly chain reaction PCR, and real-time PCR	Serological tests Rheumatoid Arthritis C-Reactive Protein C.R.P Widal test Rose Bengal Antistreptolysin test (A.S.O.T) ELISA test Poly chain reaction PCR, and real-time PCR	Lecture and Case Study	Final Exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Essentials of Clinical Pathology Book First Edition: 2010 ISBN 978-93-80704-19-7
Main references (sources)	• Essentials of Clinical Pathology Book First Edition: 2010 ISBN 978-93-80704-19-7
Recommended books and references (scientific journals, reports…)	• Manual of laboratory and Diagnostic Tests. Edition (8) copyright2009 Vol. (1) (2).by Lippincott Williams& wilkins. • Robbins Pathology Books Textbook of Diagnostic Microbiology ISBN: 978-

	1-4160-6165-6-Fourth Edition.
Electronic References, Websites	• PubMed • Microbiology Society website

Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
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Accreditation Department

Academic Program and Course Description Guide

2024

Introduction:

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Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

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Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: Al Muthanna

Faculty/Institute: Science

Scientific Department: **Biology**

Academic or Professional Program Name: **Bachelor's**

Final Certificate Name: **Bachelor's in Biology**

Academic System: **courses**

Description Preparation Date:

File Completion Date:

Signature:

Head of Department Name:

Asst. Prof. Dr. Hanaa Ali Aziz

Date:

Signature:

Scientific Associate Name:

Asst. Prof. Dr. Yasir Adil Jabbar Alabdali

Date:**26–5–2024**

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Approval of the Dean

1. **Program Vision**
Our vision is to establish a leading program in microbial genetics that cultivates a deep understanding of genetic principles and innovations. We aim to foster a learning environment that promotes scientific curiosity, critical thinking, and the application of genetic knowledge to solve real-world problems.

2. Program Mission

Our mission is to provide a comprehensive education in microbial genetics, equipping students with the knowledge and skills necessary to excel in academic, research, and industry settings. We strive to advance the field through cutting-edge research, ethical practices, and the development of innovative solutions to global challenges in health, agriculture, and biotechnology.

3. Program Objectives

The objectives of the microbial genetics program are designed to provide students with a comprehensive understanding of microbial genetics and its applications. These include:

- Introduce students to the fundamental concepts and terminology in microbial genetics.
- Explore the mechanisms and consequences of genetic variation and mutation in bacteria.
- Provide an in-depth understanding of DNA replication and repair mechanisms.
- Familiarize students with the processes of gene expression and regulation in bacteria.
- Investigate the mechanisms and implications of horizontal gene transfer.
- Introduce bacterial genomics and comparative genomics techniques.
- Explore genetic engineering and synthetic biology applications in bacteria.
- Understand the role of microbial genetics in bacterial pathogenesis and antibiotic resistance.
- Highlight recent advancements and emerging research areas in microbial genetics.

4. Program Accreditation

Yes– Ministry of Higher Education and Scientific Research (Iraq)

5. Other external influences

Ministry of Higher Education and Scientific Research (Iraq)

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements				
Department	X	3		

Requirements				
Summer Training				
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
Four			**theoretical**	**practical**

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	Understand the fundamental principles of microbial genetics, including the structure and organization of bacterial genomes, and the processes of DNA replication, transcription, and translation.
Skills	
Learning Outcomes 2	**Learning Outcome Statement 2:** Explain the mechanisms of genetic variation in bacteria, such as mutations, recombination, and horizontal gene transfer, and their significance in microbial evolution and adaptation.
Learning Outcomes 3	**Learning Outcome Statement 3:** Analyze and interpret experimental data relevant to microbial genetics, such as gene mapping, genetic screens, and transformation assays, and apply statistical methods for data analysis.
Ethics	
Learning Outcomes 4	Understand the ethical considerations in microbial genetics research, including the responsible use of genetic engineering techniques.
Learning Outcomes 5	Make informed decisions regarding ethical dilemmas in microbial genetics, emphasizing the importance of genetic integrity and responsible research practices.

9. Teaching and Learning Strategies

The program adopts a variety of teaching and learning strategies, including:

- **Active Participation and Interaction:** Encouraging students to participate in lectures, ask questions, and engage in discussions.
- **Active Listening:** Emphasizing attentive listening during explanations and demonstrations.
- **Hands-on Laboratory Sessions:** Providing practical laboratory sessions to apply theoretical knowledge.
- **Case Studies and Practical Workshops:** Incorporating real-world scenarios to enhance problem-solving skills.
- **Communication Skills Training:** Focusing on effective scientific communication, both written and oral.
- **Integration of General and Transferable Skills:** Developing critical thinking, problem-solving, and research skills.
- **Ethical Considerations:** Teaching responsible use of genetic engineering and discussing ethical dilemmas.
- **Staying Updated with Research:** Encouraging students to keep up with the latest advancements in the field.
- **Collaboration and Teamwork:** Promoting group projects and assignments to simulate real-world scientific collaborations.

10. Evaluation methods

- Evaluation methods are implemented at various stages of the program, including:
- Continuous Assessment: Regular quizzes, assignments, and participation.
- Laboratory Reports: Evaluation of practical work and experimental results.
- Examinations: Mid-term and final exams to assess comprehensive understanding.
- Projects and Presentations: Assessing the ability to apply knowledge and communicate findings.
- Peer and Self-Assessment: Encouraging reflective learning and peer feedback.
- Mid exam
- Final exam

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Assistant Professor Dr.	Biology	Molecular biology and biotechnology				

Professional Development

Mentoring new faculty members

- Orientation programs to familiarize them with departmental policies and teaching methodologies.
- Regular meetings with experienced faculty mentors to discuss teaching strategies and research integration.

Professional development of faculty members

The academic and professional development plan includes:

- Workshops on innovative teaching and learning strategies.
- Seminars on the latest research advancements in microbial genetics.
- Opportunities for faculty to attend conferences and participate in collaborative research projects.
- Regular assessments and feedback sessions to enhance teaching effectiveness.

12. Acceptance Criterion

The program follows the central admission regulations set by the university, which include academic qualifications, entrance exams, and interviews.

13. The most important sources of information about the program

1- Molecular Genetics of Bacteria (2004) 4 &5th Edition, University of Surrey, UK. John Wiley & Sons Ltd,

14. Program Development Plan

The program development plan involves continuous curriculum review and updates based on:

- Feedback from students, faculty, and industry partners.

- Emerging trends and technological advancements in microbial genetics.
- Accreditation requirements and standards.
- Periodic assessments to ensure the program meets educational and professional objectives.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Four		Microbial Genetics	Basic	+	+	+		+	+			+	+		

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name: Microbial Genetics
2. Course Code:
3. Semester / Year: second /2024
4. Description Preparation Date: 26-5-2024
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
7. Course administrator's name (mention all, if more than one name)
Name: Asst Prof. Dr. Yasir Adil Jabba Alabdali Email: yasir.alabdali@mu.edu.iq

8. Course Objectives	
Course Objectives	• **provide a thorough understanding of the chemical basis of heredity.** • **Equip students with practical skills in DNA and RNA extraction from E. coli bacteria.** • **Explore the processes of DNA replication, transcription, and translation.** • **Analyze genetic mutations, repair mechanisms, and methods for mutation selection.** • **Investigate the mechanisms of horizontal gene transfer, including transformation, transduction, conjugation.** • **Understand the regulation of gene expression in bacteria.** • **Introduce techniques for chromosome mapping and physical mapping methods.**

9. Teaching and Learning Strategies	
Strategy	• **Active Participation and Interaction: Engage students in discussions and interactive lectures to deepen** • **understanding.** • **Hands-on Laboratory Sessions: Facilitate practical experiments to apply theoretical knowledge.** • **Case Studies and Practical Workshops: Provide real-world scenarios to enhance problem-solving skills.** • **Communication Skills Training: Develop written and oral communication skills for scientific contexts.** • **Integration of General and Transferable Skills: Incorporate critical thinking, problem-solving, and research skills** • **into the curriculum.** • **Ethical Considerations: Discuss ethical issues related to genetic research and engineering.** • **Staying Updated with Research: Encourage students to read scientific journals and participate in research activities.** • **Collaboration and Teamwork: Promote group projects and teamwork to simulate scientific collaboration.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understand the chemical basis of heredity	Introduction to DNA and RNA	Lecture and Discussion	Quiz
2	2	Perform DNA extraction	DNA Extraction from E. coli	Laboratory Session	Lab Report
3	2	Analyze DNA extraction results	Measurement and Analysis	Practical Workshop	Lab Report
4	2	Understand DNA replication	DNA Replication Mechanisms	Lecture and Discussion	Mid-term Exam
5	2	Perform RNA extraction	RNA Extraction from E. coli	Laboratory Session	Lab Report
6	2	Study transcription and RNA types	Transcription Process	Lecture and Discussion	Quiz
7	2	Investigate genetic mutations	Spontaneous Mutations	Practical Workshop	Assignment
8	2	Evaluate mutation results	Mutation Analysis	Laboratory Session	Lab Report
9	2	Understand protein synthesis	Translation and Protein Synthesis	Lecture and Discussion	Quiz
10	2	Learn mutation repair mechanisms	DNA Repair Mechanisms	Lecture and Case Study	Assignment
11	2	Study mutation selection methods	Methods for Mutation Selection	Practical Workshop	Mid-term Exam
12	2	Understand transposons and integrons	Insertion Sequences, Transposons, and Integrons	Lecture and Discussion	Quiz
13	2	Perform bacterial transformation	Bacterial Transformation Experiment	Laboratory Session	Lab Report
14	2	Study genetic transformation principles	Genetic Transformation	Lecture and Discussion	Assignment
15	2	Explain bacterial conjugation Understand transduction principles	Bacterial Conjugation and F Factor Transduction with T4 Phage	Lecture and Case Study	Final Exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Molecular Genetics of Bacteria" by Larry Snyder and Wendy Champness
Main references (sources)	Molecular Genetics of Bacteria (2004) 4 &5th Edition, University of Surrey, UK. John Wiley & Sons Ltd,
Recommended books and references (scientific journals, reports…)	Brooker, Robert J. Genetics : analysis & principles / Robert J. Brooker. — 4th ed. Molecular Biology 1 and 2nd Edition by David P.

	Clark Fundamental Molecular Biology by Allison, Lizabeth.
Electronic References, Websites	• National Center for Biotechnology Information (NCBI) • PubMed • Microbiology Society website

Ministry of Higher Education and Scientific Research
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Academic Program and Course Description Guide

2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

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Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

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Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: **Al Muthanna**
Faculty/Institute: **Science of college**
Scientific Department: **Biology**
Academic or Professional Program Name: **Bsc Biology**
Final Certificate Name: **Bsc Biology**
Academic System: course
Description Preparation Date: **1/3/2024**
File Completion Date: **1/3/2024**

Signature:
Head of Department Name:
Hanaa Ali Aziz
Date:

Signature:
Scientific Associate Name:
Assist.Prof.Maitham Abbas Makei
Date:

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Date:
Signature:

Approval of the Dean

1. **Program Vision**
Program vision is written here as stated in the university's catalogue and website.

2. **Program Mission**
Program mission is written here as stated in the university's catalogue and website.

3. **Program Objectives**
1-Providing students with experience in applied life sciences. 2- Providing state institutions with specialized cadres. 3- Preparing cadres with high experience in life sciences and experience in knowing high-tech devices. 4- Providing students with scientific techniques in using devices and equipment that can be used in their theoretical and applied studies. 5--Research and study everything new in biological sciences and keep pace with scientific developments in this field.

4. **Program Accreditation**
Does the program have program accreditation? And from which agency? NO

5. **Other external influences**
Is there a sponsor for the program?

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements				
Department Requirements				
Summer Training				
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
Fourth		**Industrial Microbiology**	**theoretical**	**practical**
			2	**2**

8. Expected learning outcomes of the program

Knowledge	
Cognitive goals 1- Providing the student with sufficient information to gain experience in dealing with life sciences and laboratory techniques. 2- Gain experience in knowing all laboratory equipment and modern technologies. 3- Providing him with sufficient information to keep up with and study modern sciences.	
Skills	
Skills objectives of the programme 1- He has experience in knowing and operating equipment for laboratory tests. 2- Possessing scientific knowledge to keep pace with modern developments in biological sciences.	

Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies

Practical theoretical lectures, scientific seminars, application in laboratories, in addition to the training courses held by the department.

10. Evaluation methods

Through weekly and quarterly examinations, in addition to scientific reports.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Assist. Prof	Biology	Microbiology			✓	

Professional Development

Mentoring new faculty members

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

Professional development of faculty members

Personal development is planned through access to modern scientific sources, in addition to participating in training courses inside and outside the country in the field of scientific specialization.

12. **Acceptance Criterion**
(Setting regulations related to enrollment in the college or institute, whether central admission or others)

13. **The most important sources of information about the program**
State briefly the sources of information about the program.

14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Fourth		Industrial Microbiology	Basic	+	+	+	+	+	+	+	+	+	+		

- Please tick the boxes corresponding to the individual program learning outcomes under evaluation.

Course Description Form

1. Course Name: Industrial Microbiology

2. Course Code:

3. Semester / Year: Semester

4. Description Preparation Date:1/3/2024

5. Available Attendance Forms: 1/3/2024

6. Number of Credit Hours (4) / Number of Units (3)

7. Course administrator's name (mention all, if more than one name)

Name: Assist.Prof. Maitham Abbas Makei
Email: mabbas@mu.edu.iq

8. Course Objectives

Course Objectives	**Production of Metabolites, Industrial enzymes, Amino acid, Organic acids, Antibiotics, Vitamins and Single Cell Proteins**

9. Teaching and Learning Strategies

Strategy	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4hours		**BASICS OF INDUSTRIAL MICROBIOLOGY.**	Smart screen	**Daily and monthly exams**

2	4hours		**BASICS OF INDUSTRIAL MICROBIOLOGY.**	Smart screen	**Daily and monthly exams**
3	4hours		**TECHNIQUES IN INDUSTRIAL MICROBIOLOGY.**	Smart screen	**Daily and monthly exams**
4	4hours		**COMPONENTSOFMEDIA FORINDUSTRIALINOCUL DEVELOPMENT.**	Smart screen	**Daily and monthly exams**
5	4hours		**COMPONENTSOFMEDIA FORINDUSTRIALINOCUL DEVELOPMENT.**	Smart screen	**Daily and monthly exams**
6	4hours		**FERMENTATION PROCESSES.**	Smart screen	**Daily monthly exams**
7	4hours		**FERMENTERDESIGNAND OPERATION.**	Smart screen	**Daily monthly exams**
8	4hours		**MAINTENANCE OF SELECTED CULTURES.**	Smart screen	**Daily monthly exams**
9	4hours		**MICROBIAL ENZYMES .**	Smart screen	**Daily monthly exams**
10	4hours		**AMYLASE**	Smart screen	**Daily monthly exams**
11	4hours		**PROTEASE**	Smart screen	**Daily monthly exams**
12	4hours		**CELLULASE**	Smart screen	**Daily monthly exams**
13	4hours		PRODUCTION ANTIBIOTICS.	Smart screen	**Daily monthly exams**
14	4hours		PRODUCTIO VITAMINS .	Smart screen	**Daily monthly exams**

15	4hours		**SINGLE CELL PROTEIN .**	Smart screen	**Daily monthly exams**

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	**Riegel ER and Bissinger HG (2003) Industrial fermentation: Principles, processes and products; Vitamin B_{12} (Cyanocobalamin).** **-Gupta R, Beg QK and Lorenz P (2002) Bacterial alkaline proteases: molecular approaches and industrial applications. *Applied Microbiology and Biotechnology.***
Electronic References, Websites	

Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Programand CourseDescription Guide

2024

Introduction:

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Academic Program Description Form

University Name:Al Muthanna

Faculty/Institute:Science

Scientific Department: Biology

Academic or Professional Program Name:Bachelor's

Final Certificate Name: **Bachelor's in Biology**

Academic System:**courses**

Description Preparation Date: **26–5–2024**

File CompletionDate: **26–5–2024**

Signature:

Head of DepartmentName:

Asst. Prof. Dr. Hanaa Ali Aziz

Date:

Signature:

Scientific Associate Name:

Date:

The file is checked by:

Departmentof Quality Assurance and University Performance

Director of the Quality Assurance and UniversityPerformance Department:

Date:

Signature:

Approval of the Dean

1. Program Vision

Our vision is to create a pioneering program in virology that advances a deep understanding of the principles of viruses that cause disease. We aim to foster an educational environment that fosters scientific curiosity, critical thinking, and the application of clinical knowledge to solve real-world health problems.

2. Program Mission

Our mission is to provide a comprehensive education in virology, equipping students with the knowledge and skills necessary to excel in academic, research, and healthcare settings. We strive to advance the field through cutting-edge research, ethical practices, and the development of innovative solutions to global health challenges.

3. Program Objectives

1- Providing students with experience in applied life sciences and methods of detecting and preventing viral diseases.

2- Providing state institutions with specialized cadres.

3- Preparing cadres with high experience in life sciences and experience in knowing high-tech devices for detecting viruses.

4- Providing students with scientific techniques in using devices and equipment that can be used in their theoretical and applied studies.

5--Research and study everything new in biological sciences and keep pace with scientific developments in this field.

4. Program Accreditation

Yes– Ministry of Higher Education and Scientific Research (Iraq)

5. Other external influences

Ministry of Higher Education and Scientific Research (Iraq)

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements				
Department Requirements	X	3		

Summer Training				
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
Four		**Virology**	**theoretical**	**practical**

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	• Providing the student with sufficient information to gain experience in dealing with life sciences and laboratory techniques • Gain experience in knowing all laboratory equipment and modern technologies. • Providing him with sufficient information to keep up with and study modern sciences
Skills	
Learning Outcomes 2	**Learning Outcome Statement 2:** Possessing experience in knowledge of modern techniques in detecting viruses and methods of prevention and treatment of viral diseases.
Learning Outcomes 3	**Learning Outcome Statement 3:** Possessing scientific knowledge to keep pace with modern developments in biological sciences.
Ethics	
Learning Outcomes 4	Understand the ethical considerations, including the responsible handling of patient samples, confidentiality, and the ethical use of diagnostic techniques.
Learning Outcomes 5	• Enhancing the student's level of understanding through modern methods of learning • Providing him with accurate information • Making the student bear part of enhancing the scientific aspect

9. Teaching and Learning Strategies

Through weekly and quarterly examinations, in addition to scientific reports.

10. Evaluation methods

- Evaluation methods are implemented at various stages of the program, including:
- Continuous Assessment: Regular quizzes, assignments, and participation.
- Laboratory Reports: Evaluation of practical work and experimental results.
- Examinations: Mid-term and final exams to assess comprehensive understanding.
- Projects and Presentations: Assessing the ability to apply knowledge and communicate findings.
- Peer and Self-Assessment: Encouraging reflective learning and peer feedback.
- Mid exam
- Final exam

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Assistant Professor Dr.	Biology	Medical Microbiology			✓	

Professional Development

Mentoring new faculty members

- Orientation programs to familiarize them with departmental policies and teaching methodologies.
- Regular meetings with experienced faculty mentors to discuss teaching strategies and research integration.

Professional development of faculty members

The academic and professional development plan includes:

- Workshops on innovative teaching and learning strategies.
- Seminars on the latest research advancements in Virology.
- Opportunities for faculty to attend conferences and participate in collaborative research projects.
- Regular assessments and feedback sessions to enhance teaching effectiveness.

12. Acceptance Criterion

The program follows the central admission regulations set by the university, which include academic qualifications, entrance exams, and interviews.

13. The most important sources of information about the program

1- **Medical Microbiology: Jawetz, Melnick & Adelberg's (2013).**
2- **Medical Microbiology & Immunology: Warren Levinson (2012).**
3- **Virology Principles & Applications : Joen B. Carter & Venetia A. Saunders (2007).**

14. Program Development Plan

The development plan for the Virology program involves continuous curriculum review and updates based on the following key elements:

- **Feedback from Students, Faculty, and Industry Partners**: Regularly collect and incorporate feedback from students, faculty, and industry partners to ensure the curriculum remains relevant and meets the needs of all stakeholders.
- **Emerging Trends and Technological Advancements**: Stay abreast of the latest trends and technological advancements in pathogenic viruses and laboratory medicine to integrate new knowledge and techniques into the curriculum.
- **Accreditation Requirements and Standards**: Adhere to accreditation requirements and standards set by relevant accrediting bodies to ensure the program maintains high educational and professional standards.
- **Periodic Assessments**: Conduct regular assessments and evaluations of the program to ensure it meets its educational and professional objectives, making adjustments as necessary to improve outcomes and maintain excellence.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Four	Bio 440	Virology	optional	+	+	+		+	+			+	+		

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name: Virology

2. Course Code: **Bio 440**

3. Semester / Year: Second Semester

4. Description Preparation Date: 26-5-2024

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total):

   4/3

7. Course administrator's name (mention all, if more than one name)

   Name: Asst Prof. Dr. Noor Sami Aboud
   Email: drnoor_s78@mu.edu.iq

8. Course Objectives

Course Objectives	• **-Introducing the student to the science of viruses and explaining the relationship of this science to other sciences** • **- Identifying the structure and shape of the virus and how to isolate viruses based on a set of scientific foundations** • **- Teaching the student how to detect the virus.** • **- Introducing the student to the use of modern methods in treatment, prevention and vaccination against Viral diseases**

9. Teaching and Learning Strategies

Strateg	• **Active Participation and Interaction: Engage students in discussions and interactive lectures to deepen** • **understanding.** • **Hands-on Laboratory Sessions: Facilitate practical experiments to apply theoretical knowledge.** • **Case Studies and Practical Workshops: Provide real-world scenarios to enhance problem-solving skills.** • **Communication Skills Training: Develop written and oral communication skills for scientific contexts.** • **Integration of General and Transferable Skills: Incorporate critical thinking, problem-solving, and research skills** • **into the curriculum.** • **Ethical Considerations: Discuss ethical issues related to genetic research and engineering.** • **Staying Updated with Research: Encourage students to read scientific journals and participate in research activities.** • **Collaboration and Teamwork: Promote group projects and teamwork to simulate scientific collaboration.**

10. Course Structure

Week	Hours	Required Learning	Unit or subject name	Learning	Evaluation

		Outcomes		method	method
1	2	definition of virus, general properties and structure of viruses	Virology, definition of virus, general properties and structure of viruses	Lecture and Discussion	Quiz
2	2	Shape and size of viruses, symmetry types and study atypical virus-like agents	Shape and size of viruses, symmetry types and study atypical virus-like agents	Laboratory Session	Report
3	2	Viral replication (life cycle of virus)	Viral replication (life cycle of virus)	Practical Workshop	Report
4	2	Basis of Classification Classification Systems Transmision of viruses	Classification of viruses , Transmision of viruses	Lecture and Discussion	Mid-term Exam
5	2	Sources of infection, routes of infection, Viral Virulence, Viral pathogenesis	Viral pathogenesis	Laboratory Session	Report
6	2	Direct Demonstration. Virus Isolation & Identification. Serology.	Viral culture and laboratory diagnosis	Lecture and Discussion	Quiz
7	2	Viral Activation of Immunity, Innate immunity, Adaptive response against viruses	Host immune response against viral infection	Practical Workshop	Assignment
8	2	Aims of vaccination Programs, Types of vaccines,Antiviral drugs	Vaccinology	Laboratory Session	Report
9	2	Families of medical viruses:, DNA viruses, Important points about RNA Viruses	Classification some of important medical viruses (DNA & RNA)	Lecture and Discussion	Quiz
10	2	Important properties Classification, Pathogenesis,life cycle, Lab.Dx, Control methods	Some viruses infected human and methods of protection (Herpesviruses)	Lecture and Case Study	Assignment
11	2	Important properties: Classification, Pathogenesis,life cycle, Lab.Dx, Control methods:	Some viruses infected human and methods of protection (Paramyxoviruses , Orthomyxoviridae, Influenza virus)	Practical Workshop	Mid-term Exam
12	2	Important properties:	Some viruses infected human and methods of	Lecture and	Quiz

		Classification, Pathogenesis,life cycle, Lab.Dx, Control methods:	protection (HIV and ebola virus)	Discussion	
13	2	Important properties: Classification, Pathogenesis,life cycle, Lab.Dx, Control methods:	Some viruses infected human and methods of protection(coronaviruses and hepatitis virus)	Laboratory Session	Report

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, dailyoral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books any)	
Main references (sources)	**1- Medical Microbiology: Jawetz, Melnick & Adelberg's (2013).** **2- Medical Microbiology & Immunology: Warren Levinson (2012).** **3-Virology Principles & Applications : Joen B. Carter & Venetia A. Saunders (2007).**
Recommended books and references (scientific journals, reports…)	Scientific journals on viruses
Electronic References, Websites	• PubMed • Microbiology Society website

Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

2024

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Academic Program Description Form

University Name: **Al Muthanna**
Faculty/Institute: **Science of college**
Scientific Department: **Biology**
Academic or Professional Program Name: **Bsc Biology**
Final Certificate Name: **Bsc Biology**
Academic System: **course**
Description Preparation Date: **1/3/2024**
File Completion Date: **1/3/2024**

Signature:
Head of Department Name:
Hanaa Ali Aziz
Date:

Signature:
Scientific Associate Name:
Assist.Prof.Maitham Abbas Makei
Date:

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Date:
Signature:

Approval of the Dean

1. **Program Vision**
Program vision is written here as stated in the university's catalogue and website.

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Program mission is written here as stated in the university's catalogue and website.

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1-Providing students with experience in applied life sciences. 2- Providing state institutions with specialized cadres. 3- Preparing cadres with high experience in life sciences and experience in knowing high-tech devices. 4- Providing students with scientific techniques in using devices and equipment that can be used in their theoretical and applied studies. 5--Research and study everything new in biological sciences and keep pace with scientific developments in this field.

4. **Program Accreditation**
Does the program have program accreditation? And from which agency? NO

5. **Other external influences**
Is there a sponsor for the program?

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements				
Department Requirements				
Summer Training				
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
fourth		**Comparative Anatomy**	**theoretical**	**practical**
			2	**2**

8. Expected learning outcomes of the program

Knowledge	
Cognitive goals 1- Providing the student with sufficient information to gain experience in dealing with life sciences and laboratory techniques. 2- Gain experience in knowing all laboratory equipment and modern technologies. 3- Providing him with sufficient information to keep up with and study modern sciences.	
Skills	
Skills objectives of the programme 1- He has experience in knowing and operating equipment for laboratory tests. 2- Possessing scientific knowledge to keep pace with modern developments in biological sciences.	

Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies

Practical theoretical lectures, scientific seminars, application in laboratories, in addition to the training courses held by the department.

10. Evaluation methods

Through weekly and quarterly examinations, in addition to scientific reports.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Assist. Prof	Biology	physiology			✓	

Professional Development

Mentoring new faculty members

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

Professional development of faculty members

Personal development is planned through access to modern scientific sources, in addition to participating in training courses inside and outside the country in the field of scientific specialization.

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(Setting regulations related to enrollment in the college or institute, whether central admission or others)

13. **The most important sources of information about the program**
State briefly the sources of information about the program.

14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
fourth		Comparative Anatomy	Basic	+	+	+	+	+	+	+	+	+	+		

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name: Comparative Anatomy
2. Course Code:
3. Semester / Year: Semester
4. Description Preparation Date:1/3/2024
5. Available Attendance Forms: 1/3/2024
6. Number of Credit Hours (4) / Number of Units (3)
7. Course administrator's name (mention all, if more than one name)
Name: Assist.Prof. Hanaa Ali Aziz Email: hanabio-1983@mu.edu.iq
8. Course Objectives

Course Objectives	1. This course is designed to cover Introducing students to the most important phenotypic and anatomical characteristics through the similarities and differences between different types of vertebrate organisms such as mammals, birds, fish, and providing the student with the necessary skill to study the anatomical characteristics of various organisms. 2. This course give an overview Define the physiological science in the deferent systems .Diagnosis the main character of specific signs of cells Determined the relationship between the internal and external environment 3. Develop and encourage the field of scientific research and provide all stude with a broad education in the basic aspects and understand laboratory tests

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted to study the animal phyla. It will expected to be familiar with the names and characteristics of the phyla, be a to identify specimens and their morphology, and discuss their ecology a evolution. We will leave for field trips promptly when lab begins, so be on ti You will not be allowed to make up missed labs

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	4hours		**Chordate definition, evolutionary foundations characteristics, and origi**	Smart screen	**Daily and monthly exams**
2	4hours		**Respiratory system and respiratory mechanism**	Smart screen	**Daily and monthly exams**
3	4hours		**Digestive system and glan attached to the digestive system**	Smart screen	**Daily and monthly exams**
4	4hours		**Circulation and circulat system**	Smart screen	**Daily and monthly exams**
5	4hours		**excretory system**	Smart screen	**Daily and monthly exams**
6	4hours		**dermatology**	Smart screen	**Daily monthly exams**
7	4hours		**Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circ**	Smart screen	**Daily monthly exams**
8	4hours		**male reproductive system**	Smart screen	**Daily monthly exams**
9	4hours		**female reproductive system**	Smart screen	**Daily monthly exams**
10	4hours		**Oral cavity and digestive system**	Smart screen	**Daily monthly exams**
11	4hours		**Comparative anatomy organs in different chordates**	Smart screen	**Daily monthly exams**

12	4hours		**Types of gills and comparative anatomy**	Smart screen	**Daily monthly exams**
13	4hours		**The lymphatic system a the movement of lymphatic fluid**	Smart screen	**Daily monthly exams**
14	4hours		**Muscular system**	Smart screen	**Daily monthly exams**
15	4hours		**Skeletal system**	Smart screen	**Daily monthly exams**

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	**•Anatomy & Physiology of Animals, Floron C. Faries, Jr., DVM, MS,2015** **•Color atlas of avian anatomy, J.McLelland 1990** **• التشريح المقارت للفقريات (د. منى فريد عبد الرحمن)** **Biology journals, medical journal,**
Electronic References, Websites	