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: University of Diyala

Faculty / Institute: College of Science

Scientific Department: Physics Department

Academic or Professional Program Name: BSc.

Prof. Dr. Muhammad Hameed Al-Timimi

Final Certificate Name: BSc. In Physics and Medical Physics

Academic System: Bologna Process

Description Preparation Date: 5/9/2024

File Completion Date: 5/9/2024

Signature:

Head of Department Name:

Prof. Dr. Muhammad Hameed Al-Timimi

Date: 10/9/2024

Signature:

Scientific Associate Name:

Prof. Dr. Munther Hamza Rathi

Date: 10/9/2024

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance

Assis. Prof. Ghassan Sabeeh Mahmood

Approval of the Dean

Prof. Dr. Taha Mohammed Hasan

1. Program Vision

Welcome to the department of physics science at the university of Diyala. We are a growing, world-class department with strong programs in research and academics, nationally and internationally recognized faculty members. We pursue to provide students with access to the cutting-edge research efforts of a larger institution, while still maintaining the level of personal interaction with faculty found at smaller places. We are contributing a fundamental new knowledge at the cutting-edge of physics science and provide outstanding educational opportunities through research, teaching, and outreach. The department of physics enabling to establish a platform for the dissemination and creation of knowledge through teaching and research in Physics at various levels

2. Program Mission

The goal of the undergraduate physics program is to help students develop learning skills, problem solving techniques and professional ethics and attitudes that will support their further academic work or future employment in their technical or career of choice, through the study of physics science. Students in this program develop strong analytical, quantitative, and problem-solving skills, including a deep appreciation for connections between physics and scientific computing, physics and engineering, or physics and mathematics, to expand their career options in computer hardware/software companies, large semiconductor industries and many job sectors such as finance and business. In addition to the pure physics science, our program performs frontier studies and researches in the medical physics by focusing on medical imaging, radiotherapy, biomagnetism, and radiation metrology. We are committed to develop tools and methods that will benefit patients in our community and/or worldwide clinics. The medical physicist is not only tasked with the effective and accurate operation of existing tools, but also to continue developing new techniques that better meet the medical increasing demands. Therefore, our program awards graduate a Bachelor of Science (B.S.) either in Pure Physics and/or Medical Physics based on the majors of student's studies.

3. Program Objectives

Study the physics to gain a broad knowledge base and a problem-solving skill set that is in demand across a variety of exciting industries. Physics is the study of matter and energy and how they interact. In addition to these physical concepts, we also require our students to attain sufficient knowledge of other sciences such as mathematics and computer to support their upper-level courses and their application to our world. They can develop laboratory skills throughout our curriculum via hands-on experiences with diverse experimental techniques and tools. Graduates with a B.S. in science major, student can pursue advanced degrees in a variety of subjects or hit the job market directly, seeking work in laboratory or research settings in both public and private sectors. To do that, our program objectives include a mastery of the following:

1. To create human resources with strong foundation in Physics which can be applied to wide areas in science and technology.

2. Create qualified undergraduates who have basic skills in using observation and analytical equipment, and also able to explain physical phenomena.
3. To provide students with knowledge and understanding of the fundamental principles and technologies that underpin the discipline of physics.
4. Give students technical expertise in physics science and practical experience enabling them to be effective in a varied and fast-developing range of careers in physics.
5. Obtain research results and innovative works in physics field, either theoretically or experimentally that lead to provide information about research results in a national or international forum which supports competence for graduating.
6. Apply research results and innovative works to solve problems faced by the society using the knowledge of physics.
7. To carry out research through collaboration with researchers of other reputed academic institutions of Iraq and abroad.
8. To organize outreach activities to promote scientific culture.
9. To provide a motivating and inclusive environment with the opportunity to develop themselves intellectually and socially and to encourage students to develop as independent and self-critical problem solvers.
10. To prepare students for continued study at an advanced level, either in formal postgraduate study or as continued professional development.
11. To provide communication skill in physics majors through effectively communicate their results using written reports and oral presentations.

4. Program Accreditation

Does the program have program accreditation? And from which agency?

The program is sponsor by Ministry of Higher Education and Scientific Research in Iraq.

5. Other external influences

Is there a sponsor for the program?

By Ministry of Higher Education and Scientific Research in Iraq only.

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	4	9	4	
College Requirements	4	19	8	
Department	60	250	85	

Requirements				
Summer Training	1	6	3	
Other				

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

7-1 Program Description

Year/Level	Course Code	Course Name	Credit Hours Theoretical	Credit Hours Practical (Lab)
FIRST/ First-Semester	PHY-101	Principle of mechanics	2	2
FIRST/ First-Semester	PHY-111	Electricity	2	2
FIRST/ First-Semester	MATH-101	Differentials Method	2	
FIRST/ First-Semester	PHY-114	General Astronomy	2	
FIRST/ First-Semester	UNI-103	Democrat & Hunan Right	2	
FIRST/ First-Semester	UNI-101	Arabic Language	2	
			Total=12	Total= 4
Year/Level	Course Code	Course Name	Credit Hours Theoretical	Credit Hours Practical (Lab)
FIRST/ Second-Semester	PHY-102	Properties of Modern Physics	2	2
FIRST/ Second-Semester	PHY-112	Heat and thermodynamics	2	2
FIRST/ Second-Semester	MATH-102	Nautical Mechanic ll	2	
FIRST/ Second-Semester	SCL-123	Digital Electronic	2	2
FIRST/ Second-Semester	SCL-125	Liner Algebra	2	
FIRST/ Second-Semester	UNI-102	Sound &Wave Motion	2	2
			Total=12	Total= 8

7-2 Program Description

Year/Level	Course Code	Course Name	Credit Hours Theoretical	Credit Hours Practical (Lab)
Second / First-Semester	PHY-231	Properties of Modern physics	2	2

Year/Level	Course Code	Course Name	Credit Hours Theoretical	Credit Hours Practical (Lab)
Second / First-Semester	PHY-241	Heat & Thermodynamic	2	2
Second / First-Semester	MATH-204	Analytical Mechanics I	2	
Second / First-Semester	PHY-211	Analog Electronics	2	2
Second / First-Semester	MATH-203	Differential Equation	2	
Second / First-Semester	COMP-203	Matlab language programing		2
			Total=10	Total= 8
Year/Level	Course Code	Course Name	Credit Hours Theoretical	Credit Hours Practical (Lab)
Second / First-Semester	PHY-232	Modern physics	2	2
Second / First-Semester	PHY-242	Thermodynamic & Statistical	2	2
Second / First-Semester	PHY-202	Analytical Mechanics II	2	
Second / First-Semester	PHY-212	Digital Electronics	2	2
Second / First-Semester	MATH-204	Liner Algebra	2	
Second / First-Semester	PHY--226	Sound and Wave Motion	2	2
			Total=12	Total= 8

7-3 Program Description				
Year/Level	Course Code	Course Name	Credit Hours Theoretical	Credit Hours Practical (Lab)
Third/ First-Semester	PHY-321	Geometrical optics	2	2
Third/ First-Semester	PHY-304	Principal of Laser Physics	2	2
Third/ First-Semester	PHY-301	Principal of Quantum Mechanics	2	
Third/ First-Semester	PHY-324	Introduction in Material Physics	2	2
Third/ First-Semester	MATH-305	Numerical Analysis	2	1
Third/ First-Semester	PHY-370	Optimal 1	2	
			Total=12	Total= 7
Year/Level	Course Code	Course Name	Credit	Credit Hours

Year/Level	Course Code	Course Name	Hours Theoretical	Practical (Lab)
Third / First–Semester	PHY–322	Physical Optics	2	2
Third/ Second–Semester	PHY–305	Laser physics	2	2
Third / First–Semester	PHY–302	Quantum Mechanics	2	
Third / First–Semester	PHY–325	Material Physics	2	2
Third / First–Semester	MATH–306	Complex Analysis	2	
Third / First–Semester	PHY––371	Optional 2	2	
			Total=12	Total= 6

7–4 Program Description

Year/Level	Course Code	Course Name	Credit Hours Theoretical	Credit Hours Practical (Lab)
Fourth/ First–Semester	PHY–431	Principal of Nuclear Physics	2	2
Fourth / First–Semester	PHY–441	Principal of Solid State Physics	2	2
Fourth/ First–Semester	PHY–411	Basic of Electromagnetic Theory	2	
Fourth/ First–Semester	PHY–451	Mathematical Physics	2	
Fourth/ First–Semester	PHY–472	Optimal 3	2	
Fourth/ First–Semester	PHY–408	Research Methodology	2	
			Total=12	Total= 4
Year/Level	Course Code	Course Name	Credit Hours Theoretical	Credit Hours Practical (Lab)
Fourth/ Second–Semester	PHY–432	Nuclear Physics	2	2
Fourth/ Second–Semester	PHY–442	Solid State Physics	2	2
Fourth/ Second–Semester	PHY–412	Electromagnetic Theory	2	
Fourth/ Second–Semester	PHY–452	Plasma Physics	2	
Fourth/ Second–Semester	PHY–473	Optional 4	2	
Fourth/ Second–Semester	PHY––408	Research Project	2	
			Total=12	Total= 4

1. Expected learning outcomes of the program	
Knowledge	
Learning Outcomes 1	Graduates have significant knowledge of the theories that form the basis of classical mechanics, electromagnetism, quantum mechanics, and thermodynamic. Graduates will be able to demonstrate a balanced concept of how scientific knowledge develops, including the historical development of foundational theories and laws and the nature of physics science.
Skills	
Learning Outcomes 2	Graduates will be able to formally communicate the results of physical results and investigations using both oral and written communication skills,
Learning Outcomes 3	Graduates will be able to perform laboratory experiments and field studies, by using scientific equipment and computer technology while observing appropriate safety protocols.
Ethics	
Learning Outcomes 4	Graduates will be able to demonstrate scientific quantitative skills, such as the ability to conduct simple data analyses.
Learning Outcomes 5	Graduates will be able to use critical-thinking and problem-solving skills to develop a research project and/or manuscript.

2. Teaching and Learning Strategies

The Physics Department is committed to providing an exceptional education to our students. To that aim, we have updated our graduate program learning objectives to better align us with our Statement of Principles and the ever-advancing world. Students will acquire a general foundational knowledge of physics at the graduate level and the necessary accompanying methodological aspects of mathematics, computing, and instrumentation. Students will learn to identify and solve problems at the frontier of physics knowledge, uphold standards of scientific integrity, and disseminate their research. Student can use a scientific experimental apparatus to study the physical phenomena that release new ideas and results. Based on this knowledge, students understand the interrelations between theory and observation; the role of systematic and random experimental errors and methods used to analyze experimental uncertainty and compare experiment with theory. With this varied expertness, students can share or exchange information and scientific ideas effectively in both orally and writing. Based on medical Physics branch, student can be learning a significant number of tools and techniques that proven an effectiveness in modern medical practice.

3. Evaluation methods

Based on this knowledge, students understand the interrelations between theory and observation; the role of systematic and random experimental errors and methods used to analyze experimental uncertainty and compare experiment with theory. With this varied expertness, students can share or exchange information and scientific ideas effectively in both orally and writing.

4. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Prof. Dr. Sabah Anwar Salman	Physics	Solid state Physics			Staff	
Prof. Dr. Nabeel Ali Bakr	Physics	Thin Films, Solar Cells			Staff	
Prof. Dr. Asaad Ahmed kamil	Physics	Philosophy in Physics			Staff	
Prof. Dr. Muhammad Hameed Abduallah	Physics	Solid state Physics			Staff	
Prof. Dr. Ziad Tariq Khodair	Physics	Solid State Physics and Nanomaterial's			Staff	
Prof. Firas Mahmood Hady	Physics	Nuclear physics			Staff	
Prof. Mehdi Hatem Diwan	Physics	Solid state physics			Staff	
Assist. Prof. Dr. Olfat Ahmed Mahmood	Physics	Solid & Materials			Staff	
Assist. Prof. Dr. Ammar Ayesh Habeeb	Physics	Laser Application			Staff	
Assist. Prof. Dr. Rudaina Ali Lateef	Physics	Plasma Physics			Staff	

Assist. Prof. Dr. Jassim Muhamed Mansoor	Physics	Nanotechnology		Staff	
Assist. Prof. Dr. Omar Ahmed Mwafaq	Physics	Nuclear Physics		Staff	
Assist. Prof. Dr. Nadia Mohammed Jassim	Physics	Laser Spectra		Staff	
Assist. Prof. Dr. Jasim Mohammed Khalil	Physics	Atmospheric Phenomenology		Staff	
Assist. Prof. Dr. Faisal Ghazi Hamoudi	Physics	Philosophy in Physics		Staff	
Assist. Prof. Dr. Nada Suhail Ahmed	Physics	Laser and Molecular		Staff	
Assist. Prof. Dr.Yaqub Mohammed Jawad	Physics	Solid State and Materials Physics		Staff	
Assist. Prof. Dr. Jaafar Sadiq Mohammed	Physics	Thin Film and Image Processing		Staff	
Assist. Prof. Dr. Gailan Asaad Kazem	Physics	Applied Physics		Staff	
Lect. Dr. Firas Abed Ahmed	Physics	Nuclear Physics		Staff	
Assist. Prof. Hind Walid Abdullah	Physics	Materials		Staff	
Assist. Prof. Zena Mohammed Ali Abbas	Physics	Solid state Physics		Staff	
Lect. Jasim Mohammed Abduleteef	Physics	Solid state Physics		Staff	
Lect. Areej AbdulJalil	Physics	High Energy Physics		Staff	

Lect. Dr. Nada Ismail Ibrahim	Physics	Progeny		Staff	
Lect. Ahmed Nsaif Jasim	Physics	Solid state Physics		Staff	
Lect. Zaid Abdulhadi Abed	Physics	Quantum Physics		Staff	
Lect. Ali Hayder Redha	Physics	High Energy Physics		Staff	
Assist. Lect. Amera Kanaan Asfour	Physics	Physics		Staff	
Assist. Lect. Sabreen Abdulkareem hameed	Physics	Solid state Physics		Staff	
Assist. Lect. Zainab Saad Mahdi	Physics	Solid state Physics		Staff	
Assist. Lect. Mhammed Alwan Kadhum	Physics	Solid state physics		Staff	
Assist. Lect. Wafaa Abdulsatar Shatti	Physics	Solid state Physics		Staff	
Assist. Lect. Alyaa Hussein	Physics	Solid state Physics		Staff	
Assist. Lect. Rafid M. Abdullah	Physics	Solid state Physics		Staff	

Professional Development

Mentoring new faculty members

At physics institute, all faculty members with different majority were processed for full–time and there are not part–time faculty members at the present time.

Professional development of faculty members

Stimulating the research aspect of the academic program at physics department, various applications of the required learning outcomes and methods of teaching, learning and evaluation. Therefore, different professional development plan was applied to enhance the education level in the department that makes the faculty members use high education assessment methods and/or ways. Each faculty members has own teaching and learning methods discussions – theoretical scientific lectures – seminars, and workshops (in personal and /or team work)

Furthermore, all the test such as Written exams – oral exams, daily tests – individual work to solve problems such as homework.

5. **Acceptance Criterion**
The enrollment or admission process in the college is satisfied based on the Ministry of Higher Education and Scientific Research in Iraq only while monitoring student's performance is in the physic institutions. Central admission controls of the Ministry of Higher Education and Scientific Research for middle school graduates and first year Institutes. For instant, evaluating the students' performance in the laboratories through the discussing laboratory projects and/or class.

6. **The most important sources of information about the program**
The sources of information of the program based on the plan of Ministry of Higher Education and Scientific Research in Iraq. Furthermore, the department's website on the University of Dyala.

7. Program Development Plan
The planning and development process is carried out through feedback from the Council of Experts, the Scientific Methods Committees, and the Scientific Methods Committee. Experts for laboratory committees in accordance with the Ministry's requirement.

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
FIRST/ First–Semester	PHY–101	Principle of mechanics	Basic	V	V	V		V	V	V		V	V	V	
FIRST/ First–Semester	PHY–111	Electricity	Basic	V	V	V		V	V	V		V	V	V	
FIRST/ First–Semester	MATH–101	Differentials Method	Basic	V	V	V		V	V	V		V	V	V	
FIRST/ First–Semester	PHY–114	General Astronomy	Basic	V	V	V		V	V	V		V	V	V	
FIRST/ First–Semester	UNI–103	Democrat & Hunan Right	Basic	V	V	V		V	V	V		V	V	V	
FIRST/ First–	UNI–101	Arabic Language	Basic	V	V	V		V	V	V		V	V	V	

Semester														
FIRST/ Second- Semester	PHY-102	Properties of Modern Physics	Basic	ᴠ	ᴠ	ᴠ		ᴠ	ᴠ	ᴠ		ᴠ	ᴠ	ᴠ	
FIRST/ Second- Semester	PHY-112	Heat and thermodynamics	Basic	ᴠ	ᴠ	ᴠ		ᴠ	ᴠ	ᴠ		ᴠ	ᴠ	ᴠ	
FIRST/ Second- Semester	MATH-102	Nautical Mechanic II	Basic	ᴠ	ᴠ	ᴠ		ᴠ	ᴠ	ᴠ		ᴠ	ᴠ	ᴠ	
FIRST/ Second- Semester	SCL-123	Digital Electronic	Basic	ᴠ	ᴠ	ᴠ		ᴠ	ᴠ	ᴠ		ᴠ	ᴠ	ᴠ	
FIRST/ Second- Semester	SCL-125	Liner Algebra	Basic	ᴠ	ᴠ	ᴠ		ᴠ	ᴠ	ᴠ		ᴠ	ᴠ	ᴠ	
FIRST/	UNI-102	Sound &Wave Motion	Basic	ᴠ	ᴠ	ᴠ		ᴠ	ᴠ	ᴠ		ᴠ	ᴠ	ᴠ	

Second- **Semester**													
Second / **First-** **Semester**	**PHY-231**	**Properties of Modern** **physics**	**Basic**	V	V	V		V	V	V		V	V	V	
Second / **First-** **Semester**	**PHY-241**	**Heat & Thermodynamic**	**Basic**	V	V	V		V	V	V		V	V	V	
Second / **First-** **Semester**	**MATH-** **204**	**Analytical Mechanics I**	**Basic**	V	V	V		V	V	V		V	V	V	
Second / **First-** **Semester**	**PHY-211**	**Analog Electronics**	**Basic**	V	V	V		V	V	V		V	V	V	
Second / **First-** **Semester**	**MATH-** **203**	**Differential Equation**	**Basic**	V	V	V		V	V	V		V	V	V	

Second /First- Semester	COMP-203	Matlab language programing	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	
Second / First- Semester	PHY-232	Modern physics	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	
Second / First- Semester	PHY-242	Thermodynamic & Statistical	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	
Second / First- Semester	PHY-202	Analytical Mechanics II	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	
Second / First- Semester	PHY-212	Digital Electronics	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	
Second / First-	MATH-204	Liner Algebra	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	

Semester															
Second / First– Semester	PHY—226	Sound and Wave Motion	Basic	ν	ν	ν		ν	ν	ν		ν	ν	ν	
Third/ First– Semester	PHY–321	Geometrical optics	Basic	ν	ν	ν		ν	ν	ν		ν	ν	ν	
Third/ First– Semester	PHY–304	Principal of Laser Physics	Basic	ν	ν	ν		ν	ν	ν		ν	ν	ν	
Third/ First– Semester	PHY–301	Principal of Quantum Mechanics	Basic	ν	ν	ν		ν	ν	ν		ν	ν	ν	
Third/ First– Semester	PHY–324	Introduction in Material Physics	Basic	ν	ν	ν		ν	ν	ν		ν	ν	ν	
Third/ First– Semester	MATH– 305	Numerical Analysis	Basic	ν	ν	ν		ν	ν	ν		ν	ν	ν	
Third/ First– Semester	PHY–370	Optimal 1	Basic	ν	ν	ν		ν	ν	ν		ν	ν	ν	
Third / First–	PHY–322	Physical Optics	Basic	ν	ν	ν		ν	ν	ν		ν	ν	ν	

Semester															
Third/ Second- Semester	PHY-305	Laser physics	Basic	√	√	√		√	√	√		√	√	√	
Third / First- Semester	PHY-302	Quantum Mechanics	Basic	√	√	√		√	√	√		√	√	√	
Third / First- Semester	PHY-325	Material Physics	Basic	√	√	√		√	√	√		√	√	√	
Third / First- Semester	MATH- 306	Complex Analysis	Basic	√	√	√		√	√	√		√	√	√	
Third / First- Semester	PHY--371	Optional 2	Basic	√	√	√		√	√	√		√	√	√	
Fourth/ First- Semester	PHY-431	Principal of Nuclear Physics	Basic	√	√	√		√	√	√		√	√	√	
Fourth / First-	PHY-441	Principal of Solid State Physics	Basic	√	√	√		√	√	√		√	√	√	

Semester														
Fourth/ First- Semester	PHY-411	Basic of Electromagnetic Theory	Basic	✔	✔	✔		✔	✔	✔		✔	✔	✔
Fourth/ First- Semester	PHY-451	Mathematical Physics	Basic	✔	✔	✔		✔	✔	✔		✔	✔	✔
Fourth/ First- Semester	PHY-472	Optimal 3	Basic	✔	✔	✔		✔	✔	✔		✔	✔	✔
Fourth/ First- Semester	PHY-408	Research Methodology	Basic	✔	✔	✔		✔	✔	✔		✔	✔	✔
Fourth/ Second- Semester	PHY-432	Nuclear Physics	Basic	✔	✔	✔		✔	✔	✔		✔	✔	✔
Fourth/	PHY-442	Solid State Physics	Basic	✔	✔	✔		✔	✔	✔		✔	✔	✔

Second–Semester															
Fourth/ Second– Semester	PHY–412	**Electromagnetic Theory**	**Basic**	V	V	V		V	V	V		V	V	V	
Fourth/ Second– Semester	PHY–452	**Plasma Physics**	**Basic**	V	V	V		V	V	V		V	V	V	
Fourth/ Second– Semester	PHY–473	**Optional 4**	**Basic**	V	V	V		V	V	V		V	V	V	
Fourth/ Second– Semester	PHY––408	**Research Project**	**Basic**	V	V	V		V	V	V		V	V	V	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="3" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td>Principles of Modern Physics</td><td rowspan="5">Module Delivery

☒ Theory
☒ Lecture
☒ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Type</td><td>Core</td></tr>
<tr><td>Module Code</td><td>PHY-231</td></tr>
<tr><td>ECTS Credits</td><td>6</td></tr>
<tr><td>SWL (hr/sem)</td><td>150</td></tr>
</table>

Module Level	2	**Semester of Delivery**	3
Administering Department	Physics	**College**	Science
Module Leader	Firas Abed Ahmed	**e-mail**	firassabed@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	MS.C
Module Tutor	Zaid Abdulhadi Abed	**e-mail**	zaidabdulhadi@uodiyala.edu.iq
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	1 / 9 / 2024	**Version Number**	1.0

<table>
<tr><td colspan="4" align="center">Relation with other Modules

العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>Non</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>Non</td><td>Semester</td><td></td></tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	**Modern physics refers to physics developed in the 20th century including the special theory of relativity, quantum mechanics, atomic and nuclear physics, particle physics and cosmology. While classical physics is generally concerned with matter and energy on the normal scale of observation, much of modern physics is concerned with the behavior of matter and energy under extreme conditions or on the very large (the universe) or very small (sub-atomic level) scale.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. **Understand the concept of Reference point.** 2. **define the Special and general theories of relativity.** 3. **make Galileo conversions.** 4. **be knowledgeable about the propositions of relativity , time dilation, length contraction, Lorentz transformations, relativistic mass , the relationship between mass and energy.** 5. **comprehend the particle properties of waves.** 6. **explain the Photoelectric effect, Compton effect and Couples.** 7. **know the quantum theory of light** 8. **Recognize the X-ray diffraction and Bragg's law.** 9. **Understand the wave properties of particles** 10. **Know the concept of the wave function** 11. **be knowledgeable about Particle diffraction , behavior of particles , uncertainty principle, the Atomic structure and development, Thomson , Rutherford atomic and Bohr atom models.** 12. **Describe the series of spectra** 13. **know Frank-Hertz experiment** 14. Describe the meaning of Schrödinger equation and its simple applications. 15. Discuss Pauli Exclusion Principle and Discuss basic principles of quantum mechanics.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following:
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their ability modern physics and the relationship with real-life problem. Students understand the basic concepts, analytic skills and numeracy skills. Students also practice to explain and analyze**

	the natural phenomena and technology both qualitatively and quantitatively that exist in the environment by using basic physics concepts and apply it to everyday life.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation				
تقييم المادة الدراسية				
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	4 and 10	LO #1, #2, #3 and #4, #5, #6, #7, #8
	Assignments	2	10% (10)	5 and 12	LO #1, #2, #3 and #4, #5, #6, #7, #8
	Project	1	10% (10)	Continuous	All

	Report	1	10% (10)	14	LO #1, #2, #3 and #4, #5, #6, #7, #8
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #6
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week assignment	**Material Covered**
Week 1	**Chapter One: special relativity theory** Michelson-Morly experiment, the special relativity theory and time dilation and
Week 2	Twin paradox, length contraction and meson decay,
Week 3	Lorentz transformation and invers of Lorentz transformation and velocities addition
Week 4	Mass relativity and the relation of mass and energy
Week 5	**Chapter two: Particle properties of light** Photoelectric Phenomenon, light Quantum theory, X-Ray and X-Ray Diffraction
Week 6	Compton Phenomenon, pair production phenomenon, gravitational red-shift
Week 7	**Midterm Exam**
Week 8	**Chapter Three: Wave properties of light** Di Broglie wave, wave Function, single and grope wave velocities and particles diffraction

Week 9	Uncertainty principles, applications of uncertainty principles, the wave-particles duality and Alpha Particle
Week 10	**Chapter four: Atomic Structure** Atomic models, Rutherford scattering formula and nuclear Dimensions
Week 11	Electronic orbits, atomic spectra, energy levels and spectra
Week 12	nucleus motion, atomic excitation and correspondence principle
Week 13	**Chapter five: Quantum Mechanics** Introduction, wave equation and time-dependent schrodinger equation
Week 14	Expectation values, time-independent Schrodinger equation and energy quantization particle In a box
Week 15	particle in a box: wave functions and harmonic oscillator

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week assignment	Material Covered
Week 1	Determination of Blank constant experiment
Week 2	Determination of $\frac{e}{m}$ (Thomson method)
Week 3	Frank – Hertz Experiment for helium atom
Week 4	Midterm Exam
Week 5	Frank – Hertz Experiment for Mercury atom
Week 6	Millikan's Experiment
Week 7	Final Exam

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	Arthur Beiser (2003). Concepts of modern Physics. McGraw companies, New York , USA.	Yes
Recommended Texts	R.B. Singh (2009). Introduction to Modern Physics. NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS 4835/24, Ansari Road, Daryaganj, New Delhi - 110002	No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	**التقدير**	**Marks %**	**Definition**
Success Group **(50 - 100)**	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group **(0 – 49)**	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information
معلومات المادة الدراسية

Module Title	**Matlab Language Programming**	Module Delivery		
Module Type		☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	COS-06			
ECTS Credits	3			
SWL (hr/sem)	75			
Module Level	2	**Semester of Delivery**		3
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Zaid abdulhadi abed	**e-mail**	zaidabdulhadi@uodiyala.edu.iq	
Module Leader's Acad. Title	Lecture	**Module Leader's Qualification**	M.Sc	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	1/9/2024	**Version Number**		

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None		**Semester**	
Co-requisites module	None		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	The course aims to provide student with basic computer skills to enrich their in intellectual and technical in the fields of computer science and their various applications as well as the definition of student programs that support its academic collection.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To define and understand foundation computer (mat lab the program) . 2. This course deals with the basic concept of computer (mat lab the program) 3. To define operating system. 4. To define security of computer (mat lab the program) .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical side This course deals with the basic concept of computer (mat lab the program) , student can Understand foundation computer, operating system and security of computer. Part B – practical side The course aims to provide student with basic computer (mat lab the program) skills to enrich their in intellectual and technical in the fields of computer science: student can deal with computer by understand use of operating system and their various applications such as Microsoft office of (mat lab the program) as well as the definition of student programs that support its academic collection. Home Works and Assignments Attendance is mandatory. Every class is important. All deadlines are hard. Under normal circumstances, late work will not be accepting. Students are required to take all the tests. No make-up tests will be give under normal circumstances. Any form of cheating on exams/assignments/quizzes is subject to serious penalty Attendance 75% attendance is mandatory. Latecomers will be marked as absent

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering the computer (mat lab the program) module is to engage students actively in practical exercises to enhance their understanding and develop their critical thinking skills. The module will include a combination of classes, interactive tutorials, and hands-on experiments focused on sampling activities that capture students' interest. Through interactive classes, students will be introduced to the foundations of computer, including explain operating system, security of computer and application (mat lab the program) The module will also emphasize the importance of collaboration and teamwork. Students will be encouraged to work together on projects and assignments, fostering a collaborative learning environment where they can exchange ideas and learn from each other's perspectives.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	57	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	18	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction in MATLAB
Week 2	MATLAB commands windows
Week 3	the MATLAB fundamental

Week 4	MATLAB commands arithmetic
Week 5	Using MATLAB as a calculator
Week 6	Using MATLAB as a calculator
Week 7	M-File Scripts
Week 8	Basic syntax: vectors and matrices
Week 9	Arithmetic operators
Week 10	MATLAB commands matrices
Week 11	Algebraically operations
Week 12	Introduction to Graphics: Two-Dimensional Plots
Week 13	The fplot command
Week 14	Condition constructs: the if and else if statements
Week 15	Loop constructs: the for and while statements
Week 16	Solving basic algebraic equations

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction in MATLAB .
Week 2	Lab 2: MATLAB commands windows.
Week 3	Lab 3: Using MATLAB as a calculator.
Week 4	Lab 4: Learn Microsoft Word2010, the main interface.
Week 5	Lab 5: M-File Scripts.

Week 6	Lab 6: Algebraically operations
Week 7	Lab 15: Loop constructs: the for and while statements
Week 8	**Preparatory week before the final Exam**

<table>
<tr><td colspan="3">

Learning and Teaching Resources

مصادر التعلم والتدريس
</td></tr>
<tr><td></td><td>**Text**</td><td>**Available in the Library?**</td></tr>
<tr><td>**Required Texts**</td><td>

 MATLAB An Introduction with Applications

Rao V. Dukkipati Ph.D., P.E.

Fellow of ASME and CSME Professor and Chair

Graduate Program Director Department of Mechanical Engineering, Fairfield University

Fairfield, Connecticut

  USA
</td><td>Yes</td></tr>
<tr><td>**Recommended Texts**</td><td>

MATLAB® An Introduction with Applications

 Fourth Edition Amos Gilat Department of Mechanical Engineering The Ohio State University
</td><td>N0</td></tr>
<tr><td>**Websites**</td><td></td><td></td></tr>
<tr><td colspan="3">

Grading Scheme

مخطط الدرجات
</td></tr>
</table>

Group	Grade	التقدير	Marks %	Definition
Success Group **(50 - 100)**	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group **(0 – 49)**	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="3" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td>Principles of Mechanics</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td>Core learning activity</td><td rowspan="4">☒Theory
☒Lecture
☐Lab
☐Tutorial
☐Practical
☐Seminar</td></tr>
<tr><td>Module Code</td><td>PHY-101</td></tr>
<tr><td>ECTS Credits</td><td>8</td></tr>
<tr><td>SWL (hr/sem)</td><td>200</td></tr>
<tr><td>Module Level</td><td>UGI</td><td>Semester of Delivery   1</td></tr>
<tr><td>Administering Department</td><td></td><td>College   College of Science</td></tr>
<tr><td>Module Leader</td><td>Dr. Asaad Ahmed Kamil</td><td>e-mail   prof.asaad@uodiyala.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Professor</td><td>Module Leader's Qualification   Ph.D.</td></tr>
<tr><td>Module Tutor</td><td></td><td>e-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td></td><td>e-mail</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>1 / 9 / 2024</td><td>Version Number   1.0</td></tr>
</table>

<table>
<tr><td colspan="3" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td></tr>
</table>

<table>
<tr><td colspan="2" align="center">Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</td></tr>
<tr><td>Module Objectives
أهداف المادة الدراسية</td><td>1. To develop skills in understanding physical quantaties and vectors
2. To understand the priciples of the Rectilinear motion and rotational motion .
3. Develop an understanding of the free falling bodies.
4. Getting to know the velocity ,acceleration and Newtons law of motion.</td></tr>
</table>

	5. To understand the work and energy conservation for a body and to the system of particles.
	6.To understand the simple harmonic motion and vibration of a body.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1 . Definition of the types of physical quantaties and units of measurement of distances , times and mass. 2. Definition of the motion ,velocity and acceleration . 3. Students' knowledge of the newtons law of motion and Hooks law. 4. Identifying the affect of the friction on a bodies and knowing the motion in two dimantions. 5. Students' knowledge for circular motion and work and energy laws. 6. Definition of free falling ,simple harmonic motion .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following - Definition of the vectors, scalar product and vector product . [5 hrs] - Discussion of the force , friction , free falling and projectiels. [10 hrs] - Studying the law of velocity and acceleration and its examples . [10 hrs] - Identify the law of circular and rotatinal motion . [10 hrs]. - Study of equations of work and energy and its examples . [5 hrs]. - Identifying the equations of vibration motion and Hooks law. [5 hrs].

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted is to present this unit in theoretical lectures from the professor of the scientific subject, while encouraging students to participate in clarifying the topics through discussion among students with the use of means of clarification, including posters in addition to scientific films, with a description of recent reports of scientists in this field.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	106	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	94	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.06
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	6 and 11	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	5 and 12	LO #3, #4 and #6, #7
	Projects	1	10% (10)	7	All
	Report	2	10% (10)	4 and 10	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	9	LO #1 - #7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Vectors, Subtraction , Adding of vectors
Week 2	Scalar and vector product
Week 3	Motion In One dimension , Average velocity and Displacement , Instantaneous velocity ,Acceleration
Week 4	Free Falling Bodies
Week 5	Motion with variable Acceleration
Week 6	Motion In A Plane , Circular Motion
Week 7	Projectiles Motion
Week 8	Circular Motion with constant Angular Acceleration
Week 9	**Midterm exam**
Week 10	Force , First law of Newton's - Equilibrium
Week 11	Second and Third Newton's Law of Motion
Week 12	Mass and Weight , Friction , Viscous Forces
Week 13	Work done by constant forces -Energy - Kinetic Energy
Week 14	The work - Energy Theorem - Power
Week 15	Potential energy in one dimension , Conservation of energy
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	simple pendulum
Week 2	bifilar pendulum
Week 3	Coefficient of friction
Week 4	hooke's law
Week 5	newton's second law
Week 6	Acceleration of free falling body
Week 7	Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Principle of physics by Jerry B. Marion and William F. Hornyak ,1984 ٢- University physics by francis and others , 1982	Yes
Recommended Texts	1-College Physics by Frederick J. Bueche and Eugene. Schaums Series. Ninth Edition, 1997 .	yes
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="5" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2">Principles of Quantum Mechanics</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Core</td><td colspan="2" rowspan="4">☒Theory
☒Lecture
☐ Lab
☐Tutorial
☐Practical
☐Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">PHy-301</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">6</td></tr>
<tr><td>SWL (hr/sem)</td><td colspan="2" align="center">150</td></tr>
<tr><td>Module Level</td><td>5</td><td>Semester of Delivery</td><td colspan="2">1</td></tr>
<tr><td>Administering Department</td><td>PYS</td><td>College</td><td colspan="2">College of Science</td></tr>
<tr><td>Module Leader</td><td>Dr.Faisal Ghazi Hammoodi</td><td>e-mail</td><td colspan="2">Faissal_hammody@uodiyala.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Asst.Professor</td><td colspan="2">Module Leader's Qualification</td><td>Ph.D.</td></tr>
<tr><td>Module Tutor</td><td></td><td>e-mail</td><td colspan="2"></td></tr>
<tr><td>Peer Reviewer Name</td><td></td><td>e-mail</td><td colspan="2"></td></tr>
<tr><td>Scientific Committee Approval Date</td><td>2 / 9 / 2024</td><td>Version Number</td><td colspan="2">1.0</td></tr>
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<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To develop skills in understanding Foundation of quantum mechanics. 2. To understand the principles of the Theories of black body radiation . 3. Develop an understanding of the Schrodinger time dependent equation.. 4. Getting to know the photoelectric effect ,Requirement on wave function. 5. To understand the Requirement on wave function operators in quantum mechanics, Normalization function, Eigen function and Eigen value, Average or expectation value. 6.To understand the one-Dimensional simple harmonic oscillator classical mechanics , Generating function, the results of classical and quantum mechanics for simple harmonic oscillator.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1 . Definition of the types of physical quantities and units of measurement of linear and angular momentum , concept of times ,expectation value and parity. 2. Recognize to solve the Schrödinger equation. 3. Students' knowledge of the drive Schrodinger equation. 4. Identifying on orthogonal function, Variance, Degeneracy and Particles in one dimension box. 5. Students' knowledge on Eigen function and Eigen value, Average or expectation value. 6. Definition of Degeneracy and Generating function
Indicative Contents المحتويات الإرشادية	Indicative content includes the following - Definition of the develop skills in understanding Foundation of quantum mechanics. [5 hrs] - Discussion of the Schrodinger equation in one and three dimension [5 hrs] - Studying the law of Theories of black body radiation, photoelectric effect,The Compton Effect and Bohrs Theory of Hydrogen atom[10 hrs] - Identify the law of Normalization function, Eigen function and Eigen value , Average or expectation value, Variance Degeneracy and Parity [10 hrs]. - Study of equations of one-Dimensional simple harmonic oscillator classical mechanics and Generating function . [5 hrs]. - Identifying the equations of Probability current density equation of continuity and its physical significances, one-Dimensional simple harmonic oscillator classical mechanics [10 hrs].

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted is to present this unit in theoretical lectures from the professor of the scientific subject, while encouraging students to participate in clarifying the topics through discussion among students with the use of means of clarification, including posters in addition to scientific films, with a description of recent reports of scientists in this field.

<table>
<tr><th colspan="4">Student Workload (SWL)</th></tr>
<tr><td colspan="4">الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا</td></tr>
<tr>
<td>Structured SWL (h/sem)
الحمل الدراسي المنتظم للطالب خلال الفصل</td>
<td>63</td>
<td>Structured SWL (h/w)
الحمل الدراسي المنتظم للطالب أسبوعيا</td>
<td>2</td>
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<tr>
<td>Unstructured SWL (h/sem)
الحمل الدراسي غير المنتظم للطالب خلال الفصل</td>
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الحمل الدراسي غير المنتظم للطالب أسبوعيا</td>
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<table>
<tr><th colspan="6">Module Evaluation</th></tr>
<tr><td colspan="6">تقييم المادة الدراسية</td></tr>
<tr>
<th></th><th></th>
<th>Time/Number</th>
<th>Weight (Marks)</th>
<th>Week Due</th>
<th>Relevant Learning Outcome</th>
</tr>
<tr>
<td rowspan="4">Formative assessment</td>
<td>Quizzes</td>
<td>2</td>
<td>10% (10)</td>
<td>6 and 11</td>
<td>LO #1, #2 and #10, #11</td>
</tr>
<tr>
<td>Assignments</td>
<td>2</td>
<td>10% (10)</td>
<td>5 and 12</td>
<td>LO #3, #4 and #6, #7</td>
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<tr>
<td>Projects</td>
<td>1</td>
<td>10% (10)</td>
<td>7</td>
<td>All</td>
</tr>
<tr>
<td>Report</td>
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<td>10% (10)</td>
<td>4 and 10</td>
<td>LO #5, #8 and #10</td>
</tr>
<tr>
<td rowspan="2">Summative assessment</td>
<td>Midterm Exam</td>
<td>2hr</td>
<td>10% (10)</td>
<td>9</td>
<td>LO #1 - #7</td>
</tr>
<tr>
<td>Final Exam</td>
<td>4hr</td>
<td>50% (50)</td>
<td>16</td>
<td>All</td>
</tr>
<tr>
<td colspan="2">Total assessment</td>
<td colspan="2">100% (100 Marks)</td>
<td></td>
<td></td>
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<table>
<tr><th colspan="2">Delivery Plan (Weekly Syllabus)</th></tr>
<tr><td colspan="2">المنهاج الاسبوعي النظري</td></tr>
<tr><td></td><td>Material Covered</td></tr>
<tr>
<td>Week 1</td>
<td>Inadequacy of classical theory to explain the spectrum of black body radiation, Theories of black body radiation.</td>
</tr>
<tr>
<td>Week 2</td>
<td>photoelectric effect, The Compton Effect</td>
</tr>
<tr>
<td>Week 3</td>
<td>Bohrs Theory of Hydrogen atom,The Somerfield Relativistic atom model.</td>
</tr>
<tr>
<td>Week 4</td>
<td>Zeeman effect,Origin of normal Zeeman effect,origin of Anomalous Zeeman effect.</td>
</tr>
<tr>
<td>Week 5</td>
<td>solved Examples</td>
</tr>
<tr>
<td>Week 6</td>
<td>Schrodinger Equations, Introduction,Schrodinger time dependent equation and Schrodinger time independent equation</td>
</tr>
</table>

Week 7	Requirement on wave function, Probability current density equation of continuity and its physical significances
Week 8	operators in quantum mechanics,Normalization function, Eigen function and Eigen value
Week 9	**Midterm exam**
Week 10	Average or expectation value,Variance ,Exchanging of average value per unit time,Degeneracy
Week 11	Parity, solved Examples
Week 12	Introduction,one-Dimensional simple harmonic oscillator classical mechanics
Week 13	Normalization of wave function,Generating function
Week 14	Comparison between the results of classical and quantum mechanics for simple harmonic oscillator
Week 15	solved Examples
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1.Perspective of Quantum Mechanics by S.P.Kuila ,first edition 2008 2. Quantum Mechanics Concept and Application. By Nouredine	Yes

	Zettili 2001.	
Recommended Texts	1-1000 Solved problems in Modern physics by Ahmed A.Kamal ,2010	yes
Websites		

<table>
<tr><th colspan="5" style="text-align:center">Grading Scheme
مخطط الدرجات</th></tr>
<tr><td>Group</td><td>Grade</td><td>التقدير</td><td>Marks %</td><td>Definition</td></tr>
<tr><td rowspan="5">Success Group
(50 - 100)</td><td>A - Excellent</td><td>امتياز</td><td>90 - 100</td><td>Outstanding Performance</td></tr>
<tr><td>B - Very Good</td><td>جيد جدا</td><td>80 - 89</td><td>Above average with some errors</td></tr>
<tr><td>C - Good</td><td>جيد</td><td>70 - 79</td><td>Sound work with notable errors</td></tr>
<tr><td>D - Satisfactory</td><td>متوسط</td><td>60 - 69</td><td>Fair but with major shortcomings</td></tr>
<tr><td>E - Sufficient</td><td>مقبول</td><td>50 - 59</td><td>Work meets minimum criteria</td></tr>
<tr><td rowspan="2">Fail Group
(0 – 49)</td><td>FX – Fail</td><td>راسب (قيد المعالجة)</td><td>(45-49)</td><td>More work required but credit awarded</td></tr>
<tr><td>F – Fail</td><td>راسب</td><td>(0-44)</td><td>Considerable amount of work required</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center">Differentiation Methods</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Basic learning activity</td><td>☒ Theory</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">COS-101</td><td>☒ Lecture</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">5</td><td>Lab</td></tr>
<tr><td rowspan="3">SWL (hr/sem)</td><td colspan="2" rowspan="3" align="center">125</td><td>☐ Tutorial</td></tr>
<tr><td>☐ Practical</td></tr>
<tr><td>☐ Seminar</td></tr>
<tr><td>Module Level</td><td>UGI</td><td>Semester of Delivery</td><td>1</td></tr>
<tr><td>Administering Department</td><td></td><td>College</td><td>College of science- university of Diyala</td></tr>
<tr><td>Module Leader</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Assistant Lecturer</td><td>Module Leader's Qualification</td><td>A. L.</td></tr>
<tr><td>Module Tutor</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Peer Reviewer Name</td><td>Calculus</td><td>e-mail</td><td></td></tr>
<tr><td>Scientific Committee Approval Date</td><td>3 / 9 / 2024</td><td>Version Number</td><td>1.0</td></tr>
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<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

<table>
<tr><td align="center">Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</td></tr>
</table>

Module Objectives أهداف المادة الدراسية	This academic curriculum is a basic introduction to learning the basics of calculus, trigonometric, logarithmic and exponential functions. The student will learn methods of solution and application. The module aims to: 1- The objective required of the student in order to successfully pass the requirements of the course is to teach the student to make derivations for all mathematical functions, as well as the methods of drawing them. 2- The student's knowledge of distinguishing between functions and drawing them 3- Developing the student's ability to understand the concept of differentiation and its applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Course Outcomes and Methods of Teaching, Learning and Assessment 1-Giving lectures and using textbooks 2- Solving issues related to scientific material 3- Writing scientific reports and analyzing data 4 method of self-learning A- Cognitive goals A1- Students' ability to distinguish and cognitive perception (to diagnose general theories and principles in the study) A2-Future planning to link what the student has learned to daily life A 3- Practicing different types of mathematical proofs A 4 - self-reliance in the achievement of mathematics B - The soft skills objectives of the course B1 - skills to apply calculus B2 - skill to find limits B3 - skill to draw functions Methods of teaching and learning 1. Lecture, use of the blackboard, and recitation 2. Demos 3. Interactive discussion 4. Self-learning
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. One of the important themes in mathematic is the analysis of relationship between mathematical quantities .such relationships can be described in terms of graphs

	,formulas ,numerical data.
	Pupil will study properties of some of the most basic functions that occur in calculus and we will examine some familiar ideas involving lines, polynomials and trigonometric functions.
	2 Student definition of what is understood limits, algebra limit, continuity. limits
	Infinite , limits by One and two side
	Tangent lines and derivation, and calculations derivative of some functions by
	Using definition. Derivatives of Special functions, Mathematical models, Parametric equations

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be : A1- Students' ability to distinguish and cognitive perception (to diagnose general theories and principles in the study) A2-Future planning to link what the student has learned to daily life A 3- Practicing different types of mathematical proofs A 4 - self-reliance in the achievement of mathematics B - The soft skills objectives of the course B1 - skills to apply calculus B2 - skill to find ends B3 - skill to draw functions

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7

Unstructured SWL (h/sem)		62	Unstructured SWL (h/w)	6
الحمل الدراسي غير المنتظم للطالب خلال الفصل			الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem)		**125**		
الحمل الدراسي الكلي للطالب خلال الفصل				

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Integer numbers and real numbers intervals inequalities
Week 2	Properties of functions
Week 3	Domain and rang
Week 4	Graph of functions

Week 5	Limits
Week 6	Limits
Week 7	Continuous of functions
Week 8	Special functions
Week 9	Derivatives
Week 10	Derivatives of Special functions
Week 11	Mathematical models
Week 12	Lines
Week 13	Parametric equations
Week 14	Parametric equations
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Calculus, seven edition :Howard Anton, Irl Bivens, Stephen Davis.	Yes
Recommended Texts	Calculus and Analytic Geometry by Thomas	Yes
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition

Success Group (50 - 100)	**A – Excellent**	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C – Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX – Fail**	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			

		Module Delivery	
Module Title	**Arabic Language**	**Module Delivery**	
Module Type	**Support or learning activity**	☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**UOD-101**		
ECTS Credits	٢		
SWL (hr/sem)	**50**		

Module Level	UGI	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Othman Khlan Farhan	**e-mail**	othaman@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name(if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	1 / 9 / 2024	**Version Number**	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1- Introducing students to the most important basic keys in dealing with an eloquent Arabic language free from any error or melody, and how to learn in terms of literature, grammar, rhetoric, and Arabic dictation, and all of this is for non-specialists. 2- Raising students' expressive abilities, increasing their linguistic wealth, and helping them to use the appropriate phrase in a clear and semantic manner. 3- Training the students to speak, and the logical organization of ideas, while being careful to adhere to the classical Arabic language. 4- Raising students' general linguistic performance. - Enabling students to write, express and speak in an eloquent and clear Arabic language. 5 6- Helping students express their ideas through discussion and dialogue in an easy and eloquent language. 7- Making students able to acquire a linguistic storehouse of eloquent words, expressions and expressions. ٨- Students learned to preserve the language of the Qur'an, the original Arab heritage.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge and skill goals: 1-Knows the methods of the Arabic language. ٢-Use punctuation tools when writing. ٣-To be trained on how to analyze literary texts. ٤-Some examples and exercises express the nominal and verbal sentences. ٥-Discussing some Quranic and literary texts. ٦-Shows the difference between the original and sub-parse signs. ٧-Distinguish between verbs and nouns in sentences. ٨-Practice clear reading and diction. ٩-He is trained to write in a good handwriting by defining the types of Arabic calligraphy, writing each letter, then the book of sentences and phrases in the Ruq'a script. ١٠-Distinguish between Hamzah al-Qat` and Hamzah al-Wasl when writing. ١١-He learns the methods of speaking in front of others with the use of hand,

	eye and body gestures in proportion to speech. ١٢-Distinguish between the letters Dhaa and Dhaa in writing and pronunciation. 13- Distinguish between the tied and fatha'a while writing.
Indicative Contents المحتويات الإرشادية	Explain the importance of the Arabic language and its benefits to the university student (2 hours). Language, memorizing, interpreting and analyzing the first ten verses of Surat Al-Kahf, with an explanation of the virtue of the surah, the reason for its name, and the most important rhetorical and grammatical aspects. (2 hours) Language, memorizing, interpreting and analyzing three verses of Surat al-Hujurat, with an explanation of the virtue of the surah, the reason for its name, and the most important rhetorical and grammatical aspects. (2 hours) Literature, memorization and analysis of thirteen lines from the poem Safar Ayoub in the free poetry of the Iraqi poet Badr Shaker al-Sayyab with the life of the poet and the most important rhetorical and grammatical aspects of the poem. (2 hours) Literature, memorization and analysis of eight verses in the enthusiasm of the poet Abi al-Tayyib al-Mutanabbi with the life of the poet with the most important rhetorical and grammatical aspects of the poem. (2 hours) Arabic grammar and its importance Know the parts of speech (noun, verb and letter) and their most important signs. Arabic grammar and its importance Know the parts of speech (noun, verb and letter) and their most important signs. Arabic grammar: indefiniteness and knowledge, types of knowledge (knowledge). Explanation of the topic (the noun of knowledge and the compound noun) with examples. (2 hours) Arabic grammar, (pronouns), explaining the topic (nominative, accusative and prepositional pronouns) with examples. (2 hours) Language, memorizing, interpreting and analyzing Surat Al-Ala with an explanation of the virtue of the surah, the reason for its name, and the most important rhetorical and grammatical aspects. Literature, memorizing and analyzing eight verses from the poem (Be Balsamah) by the poet (Elia Abi Madi) with the life of the poet with the most important syntactic and rhetorical cases. (2 hours) Arabic grammar, explaining the subject of (declarative nouns) with examples and cases of inflection, explaining the subject of (the identifier in addition) with examples (and cases of inflection. (2 hours Arabic grammar, explaining the topic (al-hal), knowing the adverb and its owner, and what are the types of adverb with examples and cases of inflection. (2 hours)

Spelling in the Arabic language, punctuation marks and their importance in the Arabic language. (2 hours) Arabic grammar, explaining the topic (number), knowing the distinction of the number and what are the divisions of the number, with examples and cases of expression.		

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	-Lecture and participation. -Discussion and dialogue. -Brainstorming. -Writing reports on the subject. -Question and answer. -

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	18	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome

Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Explain the importance of the Arabic language and its benefits to the university student. Language, memorizing, interpreting and analyzing the first ten verses of Surat al-Kahf, with an explanation of the virtue of the surah, the reason for its name, and the most important rhetorical and grammatical aspects.
Week 2	Language, memorizing, interpreting and analyzing three verses of Surat al-Hujurat, with an explanation of the virtue of the surah, the reason for its name, and the most important rhetorical and grammatical aspects.
Week 3	Literature, memorization and analysis of thirteen lines from the poem Safar Ayoub in the free poetry of the Iraqi poet Badr Shaker al-Sayyab with the life of the poet and the most important rhetorical and grammatical aspects of the poem.
Week 4	Literature, memorization and analysis of eight verses in the enthusiasm of the poet Abi al-Tayyib al-Mutanabbi with the life of the poet with the most important rhetorical and grammatical aspects of the poem.
Week 5	Arabic grammar and its importance Know the parts of speech (noun, verb and letter) and their most important signs.
Week 6	Arabic grammar: indefiniteness and knowledge, types of knowledge (knowledge). Explanation of the topic (the noun of knowledge and the compound noun) with examples
Week 7	Arabic grammar, (pronouns), explaining the topic (nominative, accusative and prepositional pronouns) with examples.
Week 8	Language, memorizing, interpreting and analyzing Surat Al-Ala with an explanation of the virtue of the surah, the reason for its name, and the most important rhetorical and grammatical

	aspects.
Week 9	Literature, memorizing and analyzing eight verses from the poem (Be Balsamah) by the poet (Elia Abi Madi) with the life of the poet with the most important syntactic and rhetorical cases.
Week 10	Arabic grammar, explaining the subject of (declarative nouns) with examples and cases of inflection, explaining the subject of (the identifier in addition) with examples and cases of inflection.
Week 11	Arabic grammar, explaining the topic (al-hal), knowing the adverb and its owner, and what are the types of adverb with examples and cases of inflection.
Week 12	Spelling in the Arabic language, punctuation marks and their importance in the Arabic language
Week 13	Arabic grammar, explaining the topic (number), knowing the distinction of the number and wha are the divisions of the number, with examples and cases of expression.
Week 14	Orthography in the Arabic language, the provisions of the hamza (Hamza al-Wasl, Hamza al-Qat', writing the hamza in the middle of the word.(
Week 15	Spelling in the Arabic Language: Rulings on Writing Dhaad and Dhaa.
Week 16	Spelling in the Arabic language: the provisions of writing the tied and open Alif, the extended and the shortened Alif.

	Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered	
Week 1		
Week 2		
Week 3		
Week 4		
Week 5		
Week 6		
Week 7		

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	1. The Holy Quran. 2. The Book of Rhetoric and Application. 3. The Clear Dictation Book. 4. The Arabic language curriculum for non-specialists.	Yes
Recommended Texts	1. The Book of Explanation of Ibn Aqeel on Al-Fayya Ibn Malik / Ibn Aqeel Abdullah Bin Abdul Rahman. 2. The Book of Facilitator in the Arabic Language for Non-Professionals / Dr. Ziyad Tariq Shuli 3. The Clear Spelling Book / by Dr. Abbas Hasan. 4. Curriculum of the General Arabic Language for Non-Specialists / Abdel Qader Hassan Amin	Yes
Websites	1- Al-Mustafa Library http://www.al-mostafa.com/index.htm 2- Mishkat Al-Islam Library http://www.almeshkat.net/books/index.php 3- Scientific Society for the Arabic Language http://www.imamu.edu.sa/arabiyah 4-Picture Book Forums http://pdfbooks.net/vb/login.php	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td>General Astronomy</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td>Basic learning activity</td><td colspan="2">☒ Theory</td></tr>
<tr><td>Module Code</td><td>PHY-113</td><td colspan="2">☐ Lecture</td></tr>
<tr><td>ECTS Credits</td><td>5</td><td colspan="2">☐ Lab</td></tr>
<tr><td rowspan="3">SWL (hr/sem)</td><td rowspan="3">125</td><td colspan="2">☒ Tutorial</td></tr>
<tr><td colspan="2">☐ Practical</td></tr>
<tr><td colspan="2">☐ Seminar</td></tr>
<tr><td>Module Level</td><td>UGI</td><td>Semester of Delivery</td><td>1</td></tr>
<tr><td>Administering Department</td><td>Type Dept. Code</td><td>College</td><td>Type College Code</td></tr>
<tr><td>Module Leader</td><td>Dr. Dher Intisar Bakr</td><td>e-mail</td><td>dher@uodiyala.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Assistant Professor</td><td>Module Leader's Qualification</td><td>Ph.D.</td></tr>
<tr><td>Module Tutor</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Peer Reviewer Name</td><td>Dr. Jasim Mohammed Khalel</td><td>e-mail</td><td>Jasim_mo@uodiyala.edu.iq</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>3 / 9 / 2024</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents
	أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	1. To develop skills in understanding celestial bodies 2. To understand the components of the solar system. 3. Develop an understanding of the properties of planets and stars. 4. Getting to know the galaxy and its most important components, as well as quasi-stars and the interstellar medium. 5. To understand the type of solar energy, the most important components of the sun, and methods for measuring its properties.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Definition of the planetarium and its most important components. 2. Definition of the units of measurement of distances between planets. 3. Students' knowledge of the components of the solar system. 4. Identifying the properties of stars and knowing the factors that affect and are related to their luminosity. 5. Know the types of constellations 6. A study of the relationship between the mass of stars and their luminosity 7. Generate an overview of the galaxy and its most important properties and components 8. Definition of quasi-stars and the most important theories of the origin of the universe
Indicative Contents المحتويات الإرشادية	Indicative content includes the following - Definition of the electromagnetic spectrum . [5 hrs] - Discussion of the celestial dome and its most important components, with measuring the distance between the planets . [10 hrs] - Studying the components of the solar system, its properties, and the most important phenomena that occur in it . [10 hrs] - Identify the properties of stars and the most important factors associated with the luminosity of stars . [10 hrs]. - Study of galaxies and their specifications and types. [5 hrs]. - Identifying quasi-stars and the most important theories of the emergence of the universe. [5 hrs].

	Learning and Teaching Strategies
	استراتيجيات التعلم والتعليم
Strategies	The main strategy that will be adopted in introducing this unit It is to encourage students to participate in the discussion, while refining it at the same time expanding their critical thinking skills through modern scientific posters in the field of astronomy, and encouraging competition among groups of students through research on modern topics.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, 2 and #5, 6
	Assignments	2	10% (10)	2 and 12	LO #3, 4 and #7, 8
	Projects	1	10% (10)	Continuous	All
	Report	2	10% (10)	6 and 11	LO #6, #7 and #8
Summative	**Midterm Exam**	2hr	10% (10)	9	LO #1 - #6

assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

	Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري
	Material Covered
Week 1	Introduction to spectrum and the electromagnetic spectrum
Week 2	Planetarium and Coordinate systems in the planetarium
Week 3	Ataxia (the rotation of the earth) and Astronomical units
Week 4	The solar system and Components of the solar system and The sun and its properties
Week 5	Measurement of the sun's properties,
Week 6	Kepler's Laws , The solar atmosphere and
Week 7	Solar Wind, Sunspot , solar Radiation and Bode's Rule
Week 8	Eclipses and lunar eclipses and review the planets
Week 9	Midterm exam
Week 10	The Stars, types of stars magnitude , The Luminousness of the Stars, Inverse Square Law
Week 11	Factors affecting stellar velocity measurements, Measuring the diameters of stars,
Week 12	Hertz-Russell Diagram
Week 13	Neutron stars, Black holes, Comets, Meteors and meteoroids
Week 14	The Galaxies. Star clusters , Nebulae and interstellar medium
Week 15	Quasars , Stable Universe Theory , The Big Bang Theory , Telescope
Week 16	**Preparatory week before the final Exam**

	Delivery Plan (Weekly Lab. Syllabus)
	المنهاج الاسبوعي للمختبر
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

	Learning and Teaching Resources	
	مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	**فيزياء الجو والفضاء ج١**، د. حميد مجول النعيمي وأخرون، وزارة التعليم العالي والبحث العلمي. العراق ١٩٨١ (اللغة العربية)	Yes
Recommended Texts	Introduction to Astronomy From Darkness to Blazing Glory, Jeffrey Wright Scott, Printing by Minuteman Press, Berkley, California, 2010 . (Internet)	
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group **(50 - 100)**	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					

Module Title	**Ordinary Differential Equations**		**Module Delivery**		
Module Type	Core		☒ Theory		
Module Code	COS-05		☒ Lecture		
ECTS Credits	4		☒ Lab		
SWL (hr/sem)	100		☐Tutorial		
			☐Practical		
			☐Seminar		
Module Level	2		**Semester of Delivery**		3
Administering Department	**Physics Department**		**College**	Type College Code	
Module Leader	Name	**Firas Mahmood Hady**	**e-mail**	E-mail/ firas_1962@yahoo.com	
Module Leader's Acad. Title	**Professor**		**Module Leader's Qualification**		**M.Sc.**
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1 / 9 / 2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	

Module Objectives أهداف المادة الدراسية	1. The general objective: to raise the level of the student in mathematics in particular and in the educational process in general. 2. Acquisition of the skill in using the problem-solving method .. Community development 3. Identifying the impact of mathematics on human civilization development and emphasizing its importance in community service. 4. Introduce the student to how to deal with imaginary numbers, and understand that complex numbers are composed of a real part and an imaginary part. 5. Numbers in general are abstract mathematical concepts to carry out the operations of measuring, counting, arranging, classifying, etc.. Depending on the concepts that we want to represent and the operations that we need to do, we can find a set of numbers that are simpler or more efficient to do the required work..
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. 1. Know the concept of differentiation. 2. 2. Knowing the methods of solving equations through derivation that includes the solution of the equation 3. 3. Complete understanding of logical concepts are the concepts that logic imposes on us. As for conventional concepts, they are concepts that we assume make computations possible or easy. 4. 4. Knowing the most important basic rules for solving equations by direct integration method
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A _ . Defining the differential equation and identifying the most important ways to solve the differential equation [2 hours] . Basic rules of differentiation [2 hours] . Basic rules in integration and identify the importance of integration in solving ordinary differential equations [2 hours] . Define ordinary differential equations.[2 hours]

	.Degree and order of ordinary differential equations [2 hours]
	. Methods for solving ordinary differential equations [2 hours]
	First month exam [2 hours]
	Part B -
	. Methods for solving ordinary differential equations depending on the type of equation. [2 hours]
	. Ordinary differential equations of the first and second order [2 hours]
	. Solve all types of the ordinary differential equations using the different mathematical methods.[2 hours].
	Second month exam [2 hours]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

| Strategies | The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in the exercises, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive tutorials and by looking at simple problem solving which includes some activities of interest to the students. |

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	26	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	4	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	0
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	30 Hours		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction and define the ordinary differential equations
Week 2	The general solution and the particular solution of the Differential Equations(DE)
Week 3	Find the DE from the general solution , particular solution
Week 4	Define the degree and the order of the ordinary differential equation
Week 5	Types of all the ordinary differential equations, solve DE by variable separable method and more mathematical solved examples.
Week 6	Solve the Linear DE of the first degree and more mathematical solved examples
Week 7	**Mid-term Exam 1**
Week 8	Solve the Exact DE and more mathematical solved examples

Week 9	Bernoulli equation and more mathematical solved examples
Week 10	Homogenous DE and more mathematical solved examples
Week 11	Solve the linear homogenous DE with the constant coefficients
Week 12	Solve the non – homogenous DE with the constant coefficient
Week 13	Solve the second degree DE by using D- operator and more mathematical solved examples
Week 14	Applications the DE(Differential Equations) in physics
Week 15	**Exam 2**
Week 16	Preparatory week before the final Exam

<table>
<tr><td colspan="2" align="center">Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Week 1</td><td></td></tr>
<tr><td>Week 2</td><td></td></tr>
<tr><td>Week 3</td><td></td></tr>
<tr><td>Week 4</td><td></td></tr>
<tr><td>Week 5</td><td></td></tr>
<tr><td>Week 6</td><td></td></tr>
<tr><td>Week 7</td><td></td></tr>
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<table>
<tr><td colspan="3" align="center">Learning and Teaching Resources
مصادر التعلم والتدريس</td></tr>
<tr><td></td><td align="center">Text</td><td align="center">Available in the Library?</td></tr>
<tr><td>Required Texts</td><td>Thomas ، Calculus Early Transcendental
13 edition , by George B . Thomas , Jr. , 2014</td><td align="center">Yes</td></tr>
</table>

Recommended Texts	Differential Equations Schaum , s outlines , 4th edition , 2014	No
Websites		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group **(50 - 100)**	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة

<table>
<tr><td colspan="3">Module Information
معلومات المادة الدراسية</td></tr>
<tr>
<td>Module Title</td>
<td>Biophysics</td>
<td rowspan="6">Module Delivery

☒ Theory
☐ Lecture
☒ Lab
☐ Tutorial
☐ Practical
☒ Seminar</td>
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<tr><td>Module Type</td><td>Support</td></tr>
<tr><td>Module Code</td><td>03B</td></tr>
<tr><td>ECTS Credits</td><td>5</td></tr>
<tr><td>SWL (hr/sem)</td><td>125</td></tr>
</table>

Module Level	1	Semester of Delivery	1
Administering Department	Physics Department	**College**	College of Science
Module Leader	Zaid Abdulhadi Abed	**e-mail**	zaidabdulhadi@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	MS.C
Module Tutor	Mohammed Burhan Jumaa	**e-mail**	mohammedburhan@uodiyala.edu.iq
Peer Reviewer Name	Ahmed yaseen kazem	**e-mail**	ahmedyaseen@uodiyala.edu.iq
Scientific Committee Approval Date	3 / 9 / 2024	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	

Module Aims أهداف المادة الدراسية	1. Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- enable students to obtain knowledge and understanding of the concept of physics. 2- Enable students to obtain knowledge and understanding of the scientific laws of physics. 3- Enable students to keep pace with scientific development in all scientific fields ofphysics.
Indicative Contents المحتويات الإرشادية	This course contains a lot of vocabulary, which is a branch of physics concerne and properties of matter and energy. It includes an introduction to understanding natural phenomena, the forces and affecting their course, and the formulation of knowledge into laws that do not on aforementioned processes, but also predict the course of natural processes with gradually approach reality. The topic of general physics includes an introduction to physics, vector analysis in linear motion, circular motion, and rotational motion. Also, gravitational for torque, angular momentum, laws of motion with constant or uniform accelerate rotational motion, dynamic fluids, static fluids, particle stability, electric charge and electric potential in electrical circuits and ray optics.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.06
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 4 and 6
	Assignments	2	10% (10)	2, 12	LO # 3, 4 and 6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 6
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All

Total assessment	100% (100 Marks)

	Delivery Plan (Weekly Syllabus)
	المنهاج الاسبوعي النظري
	Material Covered
Week 1	A brief summary of the vectors, scalar and vector quantities, addition of vectors, unit vector, component of vectors, dot product and cross product. With examples for all these topics.
Week 2	Motion on a straight line: Displacement, Average velocity, Instantaneous velocity, Average acceleration, and Instantaneous acceleration. With examples for all these topics.
Week 3	Application of Motion with a constant acceleration: Freely falling bodies, and Projectile of motion. With examples for all these topics.
Week 4	Equilibrium of a particle: Understanding of forces, Newton's first law, Newton's second law, Newton's third law, and mass and weight. With examples for all these topics.
Week 5	Friction force, inclined plane, Torque of force, Center of gravity of the body, Center of mass, Motion of a system of particle, and Newton's law of universal gravitation. With examples for all these topics
Week 6	Circular and Rotational motion: Motion in a circle, uniform circular motion, central or radial force,non-uniform circular motion, Central or radial acceleration, Central force, tangential acceleration, and tension in circular motion. With examples for all these topics.
Week 7	Rotational motion, angular displacement, angular velocity, and angular acceleration. With examples for all these topics.
Week 8	**Midterm exam**
Week 9	Rotational motion with a constant angular acceleration, relation between angular and linear velocity and acceleration, torque, angular acceleration, and moment of inertia. With examples for allthese topics.
Week 10	Elasticity: The street and strain, elastic modulus, Hook's law, tensile and compressive stress and strain, Young's modulus, bulk stress and strain, bulk modulus, compressibility, shear stress and strain, Poisson's ratio, and force constant. With examples for all these topics.
Week 11	Static fluids: Density, specific gravity, pressure in a fluid, atmospheric pressure, pressure-depth-Pascal's law, buoyancy, Archimedes principle, and define the surface tension. With examples for all these topics.
Week 12	Dynamic fluids: Ideal fluid, the continuity equation, Bernoulli's equation, Venturi meter, and define the viscosity. With examples for all these topics.
Week 13	Electric charge and electric field: Conductor, insulator, and induced charges. Coulomb's law, electric field, intensity of electric field, electric potential energy, electric potential energy in a uniform field, electric potential energy of two point charges, potential difference, potential gradient, equipotential surfaces, and electric potential. With examples for all these topics.
Week 14	Geometric optics: Nature and propagation of light, wave front, properties of light, types of reflection, index of refraction, laws of reflection and refraction, total internal reflection, real and

	apparent depth, refraction by prism.
Week 15	mirrors & lenses: Spherical mirrors, image formations, spherical aberration, types of simple lenses, converging lens, diverging lens, properties of lenses, image formation by thin lenses,

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Moment of inertia for flywheel
Week 2	Simple pendulum
Week 3	Surface tension
Week 4	Speed of sound
Week 5	Glass refractive index
Week 6	diffraction grating
Week 7	Equilibrium forces
Week 8	**Midterm exam**
Week 9	Ohm's law
Week 10	Viscosity
Week 11	Wheatstone bridge
Week 12	inclined plane
Week 13	Archimedes principle
Week 14	focal length of the lens
Week 15	standing waves

Learning and Teaching Resources

	Text	Available in the Library?
	مصادر التعلم والتدريس	
Required Texts	Fundamental of Physics (Halliady, Resnick, and Walker).	Yes
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group **(50 - 100)**	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		

Module Title	**General Physics lab**	Module Delivery
Module Type		Theory Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar
Module Code		
ECTS Credits		
SWL (hr/sem)		

Module Level	1	Semester of Delivery	1
Administering Department		College	College of Science
Module Leader	ردينه صديق عبد الستار+رشا سامان محمد	e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	2 / 9 / 2024	Version Number	1.0

Relation with other Modules		
العلاقة مع المواد الدراسية الأخرى		

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop skills in understanding physical quantaties and vectors 2. To understand the priciples of the Rectilinear motion and rotational motion . 3. Develop an understanding of the free falling bodies. 4. Getting to know the velocity ,acceleration and Newtons law of motion. 5. To understand the work and energy conservation for a body and to the system of particles.

	6.To understand the simple harmonic motion and vibration of a body.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1 . Definition of the types of physical quantaties and units of measurement of distances , times and mass. 2. Definition of the motion ,velocity and acceleration . 3. Students' knowledge of the newtons law of motion and Hooks law. 4. Identifying the affect of the friction on a bodies and knowing the motion in two dimantions. 5. Students' knowledge for circular motion and work and energy laws. 6. Definition of free falling ,simple harmonic motion .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following - Definition of the vectors, scalar product and vector product . [5 hrs] - Discussion of the force , friction , free falling and projectiels. [10 hrs] - Studying the law of velocity and acceleration and its examples . [10 hrs] - Identify the law of circular and rotatinal motion . [10 hrs]. - Study of equations of work and energy and its examples . [5 hrs]. - Identifying the equations of vibration motion and Hooks law. [5 hrs].

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted is to present this unit in theoretical lectures from the professor of the scientific subject, while encouraging students to participate in clarifying the topics through discussion among students with the use of means of clarification, including posters in addition to scientific films, with a description of recent reports of scientists in this field.
Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	simple pendulum
Week 2	Resultant forces
Week 3	Melting point of wax
Week 4	Focal length determination for lenses
Week 5	Harmonic oscillation
Week 6	Ohms low
Week 7	Exam

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	1- Principle of physics by Jerry B. Marion and William F. Hornyak ,1984 2- University physics by francis and others , 1982	Yes
Recommended Texts	1-College Physics by Frederick J. Bueche and Eugene. Schaums Series. Ninth Edition, 1997 .	yes
Websites		

	Grading Scheme مخطط الدرجات			
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A - Excellent**	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX – Fail**	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		

Module Title	**Mechanics lab**	**Module Delivery**	
Module Type		Theory Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code			
ECTS Credits			
SWL (hr/sem)			
Module Level	1	**Semester of Delivery**	1
Administering Department		**College**	College of Science
Module Leader	رشا سامان محمد+فاطمة ياسين+ حيدر علي + سلمان	**e-mail**	
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	1 / 9 / 2024	**Version Number**	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop skills in understanding physical quantaties and vectors 2. To understand the priciples of the Rectilinear motion and rotational motion . 3. Develop an understanding of the free falling bodies. 4. Getting to know the velocity ,acceleration and Newtons law of motion.

	5. To understand the work and energy conservation for a body and to the system of particles.
	6.To understand the simple harmonic motion and vibration of a body.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.
	1 . Definition of the types of physical quantaties and units of measurement of distances , times and mass.
	2. Definition of the motion ,velocity and acceleration .
	3. Students' knowledge of the newtons law of motion and Hooks law.
	4. Identifying the affect of the friction on a bodies and knowing the motion in two dimantions.
	5. Students' knowledge for circular motion and work and energy laws.
	6. Definition of free falling ,simple harmonic motion .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following
	- Definition of the vectors, scalar product and vector product . [5 hrs]
	- Discussion of the force , friction , free falling and projectiels. [10 hrs]
	- Studying the law of velocity and acceleration and its examples . [10 hrs]
	- Identify the law of circular and rotatinal motion . [10 hrs].
	- Study of equations of work and energy and its examples . [5 hrs].
	- Identifying the equations of vibration motion and Hooks law. [5 hrs].

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted is to present this unit in theoretical lectures from the professor of the scientific subject, while encouraging students to participate in clarifying the topics through discussion among students with the use of means of clarification, including posters in addition to scientific films, with a description of recent reports of scientists in this field.

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	simple pendulum
Week 2	bifilar pendulum
Week 3	Coefficient of friction
Week 4	hooke's law
Week 5	newton's second law
Week 6	Acceleration of free falling body
Week 7	Exam

<table>
<tr><td colspan="3" align="center">Learning and Teaching Resources
مصادر التعلم والتدريس</td></tr>
<tr><td></td><td align="center">Text</td><td>Available in the Library?</td></tr>
<tr><td>Required Texts</td><td>1- Principle of physics   by Jerry B. Marion and William F. Hornyak ,1984

2- University physics by francis and others , 1982</td><td align="center">Yes</td></tr>
<tr><td>Recommended Texts</td><td>1-College Physics by Frederick J. Bueche and Eugene. Schaums Series. Ninth Edition, 1997 .</td><td align="center">yes</td></tr>
<tr><td>Websites</td><td></td><td></td></tr>
</table>

<table>
<tr><td colspan="5" align="center">Grading Scheme
مخطط الدرجات</td></tr>
<tr><td>Group</td><td>Grade</td><td>التقدير</td><td>Marks %</td><td>Definition</td></tr>
<tr><td rowspan="5">Success Group
(50 - 100)</td><td>A - Excellent</td><td>امتياز</td><td>90 - 100</td><td>Outstanding Performance</td></tr>
<tr><td>B - Very Good</td><td>جيد جدا</td><td>80 - 89</td><td>Above average with some errors</td></tr>
<tr><td>C - Good</td><td>جيد</td><td>70 - 79</td><td>Sound work with notable errors</td></tr>
<tr><td>D - Satisfactory</td><td>متوسط</td><td>60 - 69</td><td>Fair but with major shortcomings</td></tr>
<tr><td>E - Sufficient</td><td>مقبول</td><td>50 - 59</td><td>Work meets minimum criteria</td></tr>
<tr><td rowspan="2">Fail Group
(0 – 49)</td><td>FX – Fail</td><td>راسب (قيد المعالجة)</td><td>(45-49)</td><td>More work required but credit awarded</td></tr>
<tr><td>F – Fail</td><td>راسب</td><td>(0-44)</td><td>Considerable amount of work required</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</td></tr>
</table>

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Computer**	**Module Delivery**	
Module Type		☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	COS-103		
ECTS Credits			
SWL (hr/sem)			
Module Level	1	**Semester of Delivery**	2
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Rafid Mahmood	**e-mail**	Rafidmahmood26@gmail.com
Module Leader's Acad. Title	Assistant lecture	**Module Leader's Qualification**	M.Sc
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	3 / 9 / 2024	**Version Number**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The course aims to provide student with basic computer skills to enrich their in intellectual and technical in the fields of computer science and their various applications as well as the definition of student programs that support its academic collection.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To define and understand foundation computer. 2. This course deals with the basic concept of computer. 3. To define operating system. 4. To define security of computer.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical side This course deals with the basic concept of computer, student can Understand foundation computer, operating system and security of computer. Part B – practical side The course aims to provide student with basic computer skills to enrich their in intellectual and technical in the fields of computer science: student can deal with computer by understand use of operating system and their various applications such as Microsoft office as well as the definition of student programs that support its academic collection. Home Works and Assignments Attendance is mandatory. Every class is important. All deadlines are hard. Under normal circumstances, late work will not be accept. Students are required to take all the tests. No make-up tests will be give under normal circumstances. Any form of cheating on exams/assignments/quizzes is subject to serious penalty Attendance 75% attendance is mandatory. Latecomers will be marked as absent

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering the computer module is to engage students actively in practical exercises to enhance their understanding and develop their critical thinking skills. The module will include a combination of classes, interactive tutorials, and hands-on experiments focused on sampling activities that capture students' interest.

Through interactive classes, students will be introduced to the foundations of computer, including explain operating system, security of computer and application programs.

The module will also emphasize the importance of collaboration and teamwork. Students will be encouraged to work together on projects and assignments, fostering a collaborative learning environment where they can exchange ideas and learn from each other's perspectives.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	120	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	8	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل		**120**	

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered

Week 1	Introduction, Lifestyle of them computer, Computer generations.
Week 2	Electrical Computer, Data and Information, Computer features, Computer use areas.
Week 3	Computer components, computer features, computer types, Area of using computer.
Week 4	Computer components: Hardware and software
Week 5	Computer preparation systems, factors that must be observe when you buy a computer, the main features of PC.
Week 6	Computer security.
Week 7	Electronic penetration, malicious software, protection from penetration.
Week 8	Definition of operating systems, operating system functions.
Week 9	Operating system objectives, classification of operating systems.
Week 10	Examples of some operating systems, Windows 10
Week 11	Install the system, features, and desktop components.
Week 12	Start menu, taskbar notification area, folders and icons.
Week 13	Windows operations.
Week 14	Control Panels.
Week 15	Cases and preparations in computer.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction, Computer components: Hardware.
Week 2	Lab 2: Definition of operating systems, Windows 10, operating system functions, Install the system, features, and desktop components.
Week 3	Lab 3: Start menu, taskbar notification area, folders and icons, Control Panels, Cases and preparations in computer.
Week 4	Lab 4: Learn Microsoft Word2010, the main interface.
Week 5	Lab 5: Word Art, General setting.
Week 6	Lab 6: Text, Keyboard shortcuts.
Week 7	Lab 7: Graphics, Tables.
Week 8	Lab 8: Learn Microsoft Excel2010, the main interface.
Week 9	Lab 9: Create table, Create Series, Create functions.
Week 10	Lab 10: save file, printing setting.

Week 11	Lab 11: Data Management, Objects Management.
Week 12	Lab 12: : Learn Microsoft powerpoint2010, the main interface, Slid setting, Custom Animation
Week 13	Lab 13: file storage formats.
Week 14	Lab 14: Preparation of a multi-slide project, preparation Interactive show.
Week 15	Lab 15: Preparation photo album.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Computer basics and application	Yes
Recommended Texts		
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A - Excellent**	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX – Fail**	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة

<table>
<tr><td colspan="2" align="center">Module Information
معلومات المادة الدراسية</td></tr>
</table>

Module Title	Biophysics	Module Delivery
Module Type	Support	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ Tutorial ☐ Practical ☒ Seminar
Module Code	03B	
ECTS Credits	5	
SWL (hr/sem)	125	

Module Level	1	Semester of Delivery	1
Administering Department	Physics Department	**College**	College of Science
Module Leader	Zaid Abdulhadi Abed	**e-mail**	zaidabdulhadi@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	MS.C
Module Tutor	Mohammed Burhan Jumaa	**e-mail**	mohammedburhan@uodiyala.edu.iq
Peer Reviewer Name	Ahmed yaseen kazem	**e-mail**	ahmedyaseen@uodiyala.edu.iq
Scientific Committee Approval Date	1 / 9 / 2024	**Version Number**	1.0

<table>
<tr><td colspan="3" align="center">Relation with other Modules

العلاقة مع المواد الدراسية الأخرى</td></tr>
</table>

Prerequisite module	None	Semester	
Co-requisites module	None	**Semester**	

	Module Aims, Learning Outcomes and Indicative Contents
	أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Teaching students the basic principles of physics. 2. Preparing specialists in the field of general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and industry sectors. 3. Preparing an educated generation armed with science and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of human needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in physics who contribute to development in the country. 6. Meeting the needs of various sectors with highly qualified personals in the field of physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- enable students to obtain knowledge and understanding of the concept of physics. 2- Enable students to obtain knowledge and understanding of the scientific laws of physics. 3- Enable students to keep pace with scientific development in all scientific fields ofphysics.
Indicative Contents المحتويات الإرشادية	This course contains a lot of vocabulary, which is a branch of physics concerne and properties of matter and energy. It includes an introduction to understanding natural phenomena, the forces and affecting their course, and the formulation of knowledge into laws that do not on aforementioned processes, but also predict the course of natural processes with gradually approach reality. The topic of general physics includes an introduction to physics, vector analysis in linear motion, circular motion, and rotational motion. Also, gravitational for torque, angular momentum, laws of motion with constant or uniform accelerate rotational motion, dynamic fluids, static fluids, particle stability, electric charge and electric potential in electrical circuits and ray optics.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.06
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 4 and 6
	Assignments	2	10% (10)	2, 12	LO # 3, 4 and 6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 6
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All

Total assessment	100% (100 Marks)		

	Delivery Plan (Weekly Syllabus)
	المنهاج الاسبوعي النظري
	Material Covered
Week 1	A brief summary of the vectors, scalar and vector quantities, addition of vectors, unit vector, component of vectors, dot product and cross product. With examples for all these topics.
Week 2	Motion on a straight line: Displacement, Average velocity, Instantaneous velocity, Average acceleration, and Instantaneous acceleration. With examples for all these topics.
Week 3	Application of Motion with a constant acceleration: Freely falling bodies, and Projectile of motion. With examples for all these topics.
Week 4	Equilibrium of a particle: Understanding of forces, Newton's first law, Newton's second law, Newton's third law, and mass and weight. With examples for all these topics.
Week 5	Friction force, inclined plane, Torque of force, Center of gravity of the body, Center of mass, Motion of a system of particle, and Newton's law of universal gravitation. With examples for all these topics
Week 6	Circular and Rotational motion: Motion in a circle, uniform circular motion, central or radial force, non-uniform circular motion, Central or radial acceleration, Central force, tangential acceleration, and tension in circular motion. With examples for all these topics.
Week 7	Rotational motion, angular displacement, angular velocity, and angular acceleration. With examples for all these topics.
Week 8	**Midterm exam**
Week 9	Rotational motion with a constant angular acceleration, relation between angular and linear velocity and acceleration, torque, angular acceleration, and moment of inertia. With examples for allthese topics.
Week 10	Elasticity: The street and strain, elastic modulus, Hook's law, tensile and compressive stress and strain, Young's modulus, bulk stress and strain, bulk modulus, compressibility, shear stress and strain, Poisson's ratio, and force constant. With examples for all these topics.
Week 11	Static fluids: Density, specific gravity, pressure in a fluid, atmospheric pressure, pressure-depth-Pascal's law, buoyancy, Archimedes principle, and define the surface tension. With examples for all these topics.
Week 12	Dynamic fluids: Ideal fluid, the continuity equation, Bernoulli's equation, Venturi meter, and define the viscosity. With examples for all these topics.
Week 13	Electric charge and electric field: Conductor, insulator, and induced charges. Coulomb's law, electric field, intensity of electric field, electric potential energy, electric potential energy in a uniform field, electric potential energy of two point charges, potential difference, potential gradient, equipotential surfaces, and electric potential. With examples for all these topics.
Week 14	Geometric optics: Nature and propagation of light, wave front, properties of light, types of reflection, index of refraction, laws of reflection and refraction, total internal reflection, real and

	apparent depth, refraction by prism.
Week 15	mirrors & lenses: Spherical mirrors, image formations, spherical aberration, types of simple lenses, converging lens, diverging lens, properties of lenses, image formation by thin lenses,

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Moment of inertia for flywheel
Week 2	Simple pendulum
Week 3	Surface tension
Week 4	Speed of sound
Week 5	Glass refractive index
Week 6	diffraction grating
Week 7	Equilibrium forces
Week 8	**Midterm exam**
Week 9	Ohm's law
Week 10	Viscosity
Week 11	Wheatstone bridge
Week 12	inclined plane
Week 13	Archimedes principle
Week 14	focal length of the lens
Week 15	standing waves

Learning and Teaching Resources

	Text	Available in the Library?
	مصادر التعلم والتدريس	
Required Texts	Fundamental of Physics (Halliady, Resnick, and Walker).	Yes
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group **(50 - 100)**	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group **(0 – 49)**	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
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Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td align="center"><strong style="color:red">Mathematical Physics</td><td colspan="2" align="center">Module Delivery</td></tr>
<tr><td>Module Type</td><td align="center">Core</td><td colspan="2" rowspan="4">☒ Theory
☒ Lecture
☐ Lab
☒ Tutorial
☐ Practical
☒ Seminar</td></tr>
<tr><td>Module Code</td><td align="center">Phy-451</td></tr>
<tr><td>ECTS Credits</td><td align="center">6</td></tr>
<tr><td>SWL (hr/sem)</td><td align="center">150</td></tr>
<tr><td colspan="2" align="center">Module Level</td><td align="center">UGIV</td><td align="center">Semester of Delivery   7</td></tr>
<tr><td colspan="2" align="center">Administering Department</td><td align="center">Physics</td><td>College</td></tr>
<tr><td colspan="2" align="center">Module Leader</td><td align="center">Nabeel Ali Bakr</td><td>e-mail   nabeelalibakr@yahoo.com</td></tr>
<tr><td colspan="2" align="center">Module Leader's Acad. Title</td><td align="center">Professor</td><td>Module Leader's Qualification   Ph.D.</td></tr>
<tr><td colspan="2" align="center">Module Tutor</td><td align="center">-----</td><td>e-mail   -----</td></tr>
<tr><td colspan="2" align="center">Peer Reviewer Name</td><td align="center">-----</td><td>e-mail   -----</td></tr>
<tr><td colspan="2" align="center">Scientific Committee Approval Date</td><td align="center">1 / 9 / 2024</td><td>Version Number   1.0</td></tr>
</table>

<table>
<tr><td colspan="3" align="center">Relation with other Modules

العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td align="center">Solution of Differential Equations</td><td>Semester   3</td></tr>
<tr><td>Co-requisites module</td><td align="center">None</td><td>Semester</td></tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. The purpose of the course is to introduce students to methods of mathematical physics and to develop required mathematical skills to solve problems in quantum mechanics, electrodynamics and other fields of theoretical physics. 2. To understand special functions, periodic functions, Fourier series analysis, and solution of partial differential equations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Using special functions to solve different problems of definite integrals. 2. Describe the special functions and their recurrence relations. 3. Get familiar with the concept of error functions and its applications. 4. Understand the properties of periodic functions and their importance in physics. 5. Discuss the exact solution of pendulum motion. 6. Understand the concept of average of function. 7. Expand functions using Fourier series analysis. 8. Ability to solve partial differential equations.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Part 1 An introduction to special functions and their importance in physics Gamma Function Beta Function Exact Solution of Pendulum Motion Error Function and Sterling Approximation Part 2 Periodic Functions Average of Function in a Given Interval Fourier Series Part 3 Partial differential equations in physics Separation of variables method Fuchs's theorem Frobenius method Legendre's differential equation Hermite's differential equation Bessel's differential equation

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their ability to mathematical and real-life problem solving, the ability to use mathematics as a communication tool, the ability to connect mathematical ideas, the ability to reasoning that can be used in any situation, such as critical thinking, logical, and systematic; be objective, honest, discipline and solve problems. This will be achieved through classes, reports, projects and interactive tutorials.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	73	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.9
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation				
تقييم المادة الدراسية				
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4 and 10	LO #1, #2, #3 and #4, #5, #6, #7, #8
	Assignments	2	10% (10)	5 and 12	LO #1, #2, #3 and #4, #5, #6, #7, #8
	Project	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO #1, #2, #3 and #4, #5, #6, #7, #8
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #6
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	An introduction to special functions and their importance in physics
Week 2	Gamma Function
Week 3	Beta Function
Week 4	Exact Solution of Pendulum Motion
Week 5	Error Function and Sterling Approximation
Week 6	Periodic Functions
Week 7	Average of Function in a Given Interval
Week 8	Mid-term Exam
Week 9	Fourier Series
Week 10	Partial differential equations in physics
Week 11	Separation of variables method
Week 12	Fuchs's theorem and Frobenius method
Week 13	Legendre's differential equation
Week 14	Hermite's differential equation
Week 15	Bessel's differential equation

| Delivery Plan (Weekly Lab. Syllabus) ||
المنهاج الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	لايوجد مختبر
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

| Learning and Teaching Resources |||
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Mathematical methods in the physical sciences by M. Boas.	Yes
Recommended Texts	1. Mathematical methods for physicists by G. Arfken.	Yes
	2. Calculus Early Transcendentals by G. Thomas	yes
	3. Methods of Mathematical Physics by Harold Jeffreys & Bertha Swirles Jeffreys	No
	4. Methods of Mathematical Physics by R. Courant and D. Hilbert	No
	5. Mathematical Physics by E. Butkov	No
Websites	http://ocw.mit.edu/courses/mathematics/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group **(50 - 100)**	**A - Excellent**	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group **(0 – 49)**	**FX – Fail**	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	**Physics**		**Module Delivery**	
Module Type	Core		☒Theory ☒Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**UoB12345**			
ECTS Credits	**8**			
SWL (hr/sem)	**100**			
Module Level	1	**Semester of Delivery**		1
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Name	**e-mail**	E-mail	
Module Leader's Acad. Title	Assistant lec.	**Module Leader's Qualification**		Msc.
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	3 / 9 / 2024	**Version Number**	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	**After completing the course**, Students are able: Intended Learning 1- Have the knowledge of fundamental Computing Science that includes basic theory and concept of computer science, Mathematics, and Statistics, Programming Algorithm, Software Engineering and Information System. 2- Able to demonstrate and analyze the basic property of object/matter in the form of physical equation related to particle kinematic, interaction force between particles/matter, harmonic oscillator, the elasticity of the material, static and dynamic fluid, temperature and heat, and thermodynamic. 3- Able to solve physics problems independently and responsibly with complete physical completion method 4- Able to use the basic equations of physics in solving problems with Newton's laws of motion, work and energy, linear momentum, and collisions 5- Able to analyze basic physical property based on mathematical concept and formulation about the elasticity of the material, harmonic oscillator, temperature and heat 6- Able to distinguish the first and second thermodynamic equations and able to analyze 4 thermodynamic processes (K) iso volume, isobaric, isothermal, and adiabatic and Able to design and demonstrate the basic principles of physics in conducting experiments on object motion, temperature and heat, mathematical pendulum motion (K).
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this module the student should be able to: 1.Define a fluid and its basic properties, 2.Apply conservation of mass, energy and momentum to fluid flow, 3.Compute hydraulic gradients and design pipe networks, 4.Analyse flows and pressures for single pipe network using the continuity and steady flow energy equations, 5.Apply well-established techniques to solve engineering problemsin fluid mechanics 6.Evaluate the force on a bend/nozzle due to momentum change.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Students will learn about : 1. Quantity and Unit 2. Particle Kinematics 3. Particle Dynamics 4. Work and Energy 5. Linear momentum and collision 6. Angular Momentum and Inertia

	7. Harmonic Oscillator			
	8. Material Elasticity			
	9. Fluid Statistics			
	10. Fluid Dynamics			
	11. Temperature and Heat			
	12. Laws of Thermodynamics			

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	69	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	31	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered	
1–4	Chapter 1: "Introduction."	• Viscosity and Other Secondary • Properties • Surface Tension
1–4 (continued)	Chapter 2: "Pressure Distribution in a Fluid."	• Pressure and Pressure Gradient • Equilibrium of a Fluid Element • Hydrostatic Pressure Distributions • Application to Manometry • Hydrostatic Forces on Plane Surfaces • Hydrostatic Forces on Curved Surfaces • Hydrostatic Forces in Layered Fluids • Buoyancy and Stability • Pressure Distribution in a Rigid-Body Motion • Pressure Measurement
5–10	Chapter 3: "Integral Relations for a Control Volume."	• Basic Physical Laws of Fluid Mechanics • The Reynolds Transport Theorem • Conservation of Mass • The Linear Momentum Equation • Frictionless Flow: The Bernoulli Equation • The Angular Momentum Theorem • The Energy Equations

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: No lab sections meet this week
Week 2	Lab 2 : Introduction to Techniques in physics dep.
Week 3	Lab 3 : explain how to draw curves
Week 4	Lab 4: exam
Week 5	Lab 5: ohms law
Week 6	Lab 6: An investigation of Kirchhoff's law
Week 7	Lab 7: coil self-induction

Week 8	Lab 8: Diffraction of light by holes
Week 9	Lab9:young law
Week 10	Lab 10: No Labs Spring Break
Week 11	Lab 11: pressure measurement
Week 12	Lab 12: payless law
Week 13	Lab 13: surface tension
Week 14	Lab14: Re-run experiments as necessary
Week 15	Lab 15: exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	fluid mechanics fundamental and applications Cengel_Cimbala. Published by McGraw-Hill 2006.	Yes
Recommended Texts	Bruce R. Munson, Donald F. Young, Theodore H. Okiishi, and Wade W. Huebsch, Fundamentals of Fluid Mechanics, John Wiley & Sons, 6th ed., 2009.	No
Websites	Related books and magazines	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Mechanics lab**		**Module Delivery**
Module Type			Theory Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar
Module Code			
ECTS Credits			
SWL (hr/sem)			
Module Level	1	**Semester of Delivery**	1
Administering Department		**College**	College of Science
Module Leader	م.م. علي عبد الستار صلال+ م.م. حيدر + علي سلمان	**e-mail**	aliabdulsattatr@uodiyala.edu.iq
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	3 / 9 / 2024	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop skills in understanding physical quantaties and vectors 2. To understand the priciples of the Rectilinear motion and rotational motion . 3. Develop an understanding of the free falling bodies. 4. Getting to know the velocity ,acceleration and Newtons law of motion. 5. To understand the work and energy conservation for a body and to the system of particles. 6.To understand the simple harmonic motion and vibration of a body.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1 . Definition of the types of physical quantaties and units of measurement of distances , times and mass. 2. Definition of the motion ,velocity and acceleration . 3. Students' knowledge of the newtons law of motion and Hooks law. 4. Identifying the affect of the friction on a bodies and knowing the motion in two dimantions. 5. Students' knowledge for circular motion and work and energy laws. 6. Definition of free falling ,simple harmonic motion .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following - Definition of the vectors, scalar product and vector product . [5 hrs] - Discussion of the force , friction , free falling and projectiels. [10 hrs] - Studying the law of velocity and acceleration and its examples . [10 hrs] - Identify the law of circular and rotatinal motion . [10 hrs]. - Study of equations of work and energy and its examples . [5 hrs]. - Identifying the equations of vibration motion and Hooks law. [5 hrs].

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted is to present this unit in theoretical lectures from the professor of the scientific subject, while encouraging students to participate in clarifying the topics through discussion among students with the use of means of clarification, including posters in addition to scientific films, with a description of recent reports of scientists in this field.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	simple pendulum
Week 2	bifilar pendulum
Week 3	Coefficient of friction
Week 4	hooke's law
Week 5	newton's second law
Week 6	Acceleration of free falling body
Week 7	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Principle of physics by Jerry B. Marion and William F. Hornyak ,1984 2- University physics by francis and others , 1982	Yes

Recommended Texts	1-College Physics by Frederick J. Bueche and Eugene. Schaums Series. Ninth Edition, 1997 .	yes
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group **(50 - 100)**	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="2" align="center">Module Information
معلومات المادة الدراسية</td><td></td></tr>
<tr><td>Module Title</td><td align="center">Analytical Mechanics</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td align="center">Core</td><td>☒ Theory</td></tr>
<tr><td>Module Code</td><td align="center">PHY-202</td><td>☐ Lecture</td></tr>
<tr><td>ECTS Credits</td><td align="center">4</td><td>☐ Lab</td></tr>
<tr><td rowspan="3">SWL (hr/sem)</td><td rowspan="3" align="center">100</td><td>☒ Tutorial</td></tr>
<tr><td>☐ Practical</td></tr>
<tr><td>☐ Seminar</td></tr>
<tr><td>Module Level</td><td>2</td><td>Semester of Delivery | 2</td></tr>
<tr><td>Administering Department</td><td>Type Dept. Code</td><td>College | Type College Code</td></tr>
<tr><td>Module Leader</td><td>A.L. Haydar Ali Salman</td><td>e-mail | haydarali@uodiyala.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Assistant Lecturer</td><td>Module Leader's Qualification | M.Sc.</td></tr>
<tr><td>Module Tutor</td><td>A.L. Haydar Ali Salman</td><td>e-mail | haydarali@uodiyala.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td></td><td>e-mail</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>1 / 9 / 2024</td><td>Version Number | 1.0</td></tr>
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<table>
<tr><td colspan="3" align="center">Relation with other Modules

العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td></tr>
</table>

Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To develop skills in solving Lagrangian and Hamilton equations. 2. To understand the linear momentum and angular momentum. 3. Develop an understanding of the potential energy and kinetic energy for a particle system. 4. Getting to know the rocket motion, motion of a body of variable mass, and the law of universal gravitation. 5. To understand the motion in orbits and Kepler's laws.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Definition of the Lagrange equations and the Lagrange function. 2. Definition of the Hamilton's equations and the Hamilton function. 3. Students' knowledge of the collision and its types. 4. Identifying the potential energy and kinetic energy of a particle system. 5. Know the rocket motion and motion of an object of variable mass 6. A study of the relationship between the potential energy and kinetic energy in a general gravitational field and angular momentum in a centripetal force field. 7. Generate an overview of the orbit of the particle in the centripetal force field and the orbital energy equation 8. Definition of motion in orbits approximates circularity and Kepler's laws of celestial mechanics.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following - Definition of the fundamental concepts of Lagrange's and Hamilton's equations and their applications. [10 hrs] - Discussion of the collision, its types, and the general law of gravitation. [10 hrs] - Studying the components of the potential energy and kinetic energy in a field of attraction. [10 hrs]

	- Identify the rocket motion and motion of a body of variable mass. [10 hrs].
	- Study of the angular momentum in a central force field.[10 hrs].
	- Identifying of the orbit of the particle in the centripetal force field and the orbital energy equation. [10 hrs].

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in introducing this unit It is to encourage students to participate in the discussion, while refining it at the same time expanding their critical thinking skills through modern scientific posters in the field of analytical mechanics, and encouraging competition among groups of students through research on modern topics.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	53	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome

Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, 2 and #5, 6
	Assignments	2	10% (10)	2 and 12	LO #3, 4 and #7, 8
	Projects	1	10% (10)	Continuous	All
	Report	2	10% (10)	6 and 11	LO #6, #7 and #8
Summative assessment	**Midterm Exam**	2hr	10% (10)	9	LO #1 - #6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Lagrange equations - Lagrange function
Week 2	Applications of Lagrange's Equations
Week 3	Hamilton's Equations - Hamiltonian Function
Week 4	Applications of Hamilton's equations
Week 5	The center of mass of a particle system
Week 6	Linear momentum and angular momentum
Week 7	Potential energy and kinetic energy of a particle system
Week 8	Collision and its types
Week 9	Midterm exam
Week 10	Rocket movement - movement of a body of variable mass

Week 11	The general law of attraction
Week 12	Potential energy and kinetic energy in a field of attraction
Week 13	Angular momentum in a central force field
Week 14	Orbit of a particle in a centripetal force field - orbital energy equation
Week 15	Motion in orbits approaching circularity - stability - Kepler's laws of celestial mechanics
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**

Required Texts	ANALYTICAL MECHANICS By FOWLES & CASSIDAY SEVENTH EDITION 2005	Yes
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group **(50 - 100)**	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="5" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center">Atmospheric physics</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Elective</td><td colspan="2" rowspan="4">☒ Theory
☒ Lecture
☐ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2"></td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">4</td></tr>
<tr><td>SWL (hr/sem)</td><td colspan="2" align="center">100</td></tr>
<tr><td>Module Level</td><td>3</td><td>Semester of Delivery</td><td colspan="2">6</td></tr>
<tr><td>Administering Department</td><td>PHY</td><td>College</td><td colspan="2">COS</td></tr>
<tr><td>Module Leader</td><td>Dr.Jasim mohammed Khalel</td><td>e-mail</td><td colspan="2">Jasim_mo@uodiyala.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Assistant Professor</td><td colspan="2">Module Leader's Qualification</td><td>Ph.D.</td></tr>
<tr><td>Module Tutor</td><td></td><td>e-mail</td><td colspan="2"></td></tr>
<tr><td>Peer Reviewer Name</td><td>Dr.Dhar Intesar Bakr</td><td>e-mail</td><td colspan="2">dher@uodiyala.edu.iq</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>3 / 9 / 2024</td><td colspan="2">Version Number</td><td>1.0</td></tr>
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<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td>6</td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of atmospheric physics 2. To understand layer of atmosphere, type of physical mechanism in atmosphere. 3. This course deals with the concept of atmospheric physics. 4. To identify the main phenomena in the atmosphere. 5. To understand type of energy and their measurement methods. 6. To perform the cloud physics and precipitation technique.	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the properties of atmospheric layer. 2. List the various phenomena in the atmosphere. 3. Summarize the characterization of cloud physics. 4. Discuss type of energy and their calculation methods. 5. Describe the radiation from the sun and its component that reflected from earth surface. 6. Define methods of heat transferring in atmosphere. 7. Identify the cloud condensation and dew point temperature. 8. Discuss the cloud condensation nuclei. 9. Discuss the various type of precipitation and measurements technique. 10. Explain the global warming and its effect on climate change.	
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Define the history of atmospheric gases and the atmospheric layers properties and the important composition of these layers . [10 hrs] - Emphasis the important physical presses that happened in atmosphere. [10 hrs] - Discus the important phenomena in the atmosphere. [8 hrs] - Define the radiation and state the main methods of heat transfer. [5 hrs] - study the cloud condensation and the techniques of cloud seeding. [5 hrs] - learn the idea of climate change and global warming phenomenon. [10 hrs]	

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their atmosphere physics and its phenomena thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

	Delivery Plan (Weekly Syllabus)
	المنهاج الاسبوعي النظري
	Material Covered
Week 1	Introduction to the Atmosphere and Descriptions of Atmospheric Behavior
Week 2	Mechanisms Influencing Atmospheric Behavior
Week 3	Layers, Composition and Structure of atmosphere
Week 4	Composition and Structure
Week 5	Description of Air and Stability in Terms of Temperature
Week 6	Atmospheric Radiation, Shortwave and Longwave Radiation
Week 7	Emission Planck's Law Wien's Displacement Law The Stefan-Boltzmann Law
Week 8	Midterm exam
Week 9	Microphysics of Clouds, cloud condensation, cloud nuclei
Week 10	Atmospheric phenomena
Week 11	precipitation types and measurements teqneques
Week 12	Energy types and heat transfer methods
Week 13	Climate variability, climate change
Week 14	Global warming, greenhouse gases
Week 15	Influence of global warming on our life.
Week 16	**Preparatory week before the final Exam**

	Delivery Plan (Weekly Lab. Syllabus)
	المنهاج الاسبوعي للمختبر
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

<table>
<tr><td colspan="3" align="center">**Learning and Teaching Resources**
مصادر التعلم والتدريس</td></tr>
<tr><td></td><td align="center">**Text**</td><td>**Available in the Library?**</td></tr>
<tr><td>**Required Texts**</td><td>Stevens, B. (2010). Twelve Lectures on Cloud Physics. *Max Planck Institute for Meteorology-University of Hamburg.*</td><td align="center">no</td></tr>
<tr><td>**Recommended Texts**</td><td>Salby, M. L. (2012). *Physics of the Atmosphere and Climate.* Cambridge University Press.</td><td align="center">no</td></tr>
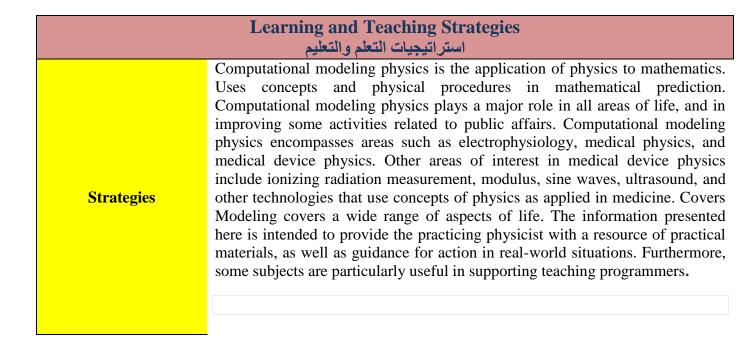<tr><td>**Websites**</td><td></td><td></td></tr>
</table>

	Grading Scheme مخطط الدرجات			
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A - Excellent**	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX – Fail**	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

`MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	**Image processing**		**Module Delivery**	
Module Type	**Core**		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code				
ECTS Credits				
SWL (hr/sem)				
Module Level		**Semester of Delivery**		2
Administering Department		**College**	**Type College Code**	
Module Leader	**Jaafar Sadeq mohammed**	**e-mail**	jafer.mm1967@uodiyala.edu.iq	
Module Leader's Acad. Title	Assistant Professor Dr.	**Module Leader's Qualification**	**Ph.D.**	
Module Tutor	Assistant Lecturer: **Chia haseeb kareem**	**e-mail**	**E-mail chiahaseeb@uodiyala.edu.iq**	
Peer Reviewer Name	**Name**	**e-mail**	**E-mail**	
Scientific Committee Approval Date	1 / 9 / 2024	**Version Number**	**1.0**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**None**	**Semester**	
Co-requisites module	**None**	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This unit will provide students with a solid understanding of the importance of the basic principles of image processing in business. The focus is on connecting this understanding to the meaning of image processing and its importance in practical and academic life Students will gain experience with the entire process and will have opportunities to discuss

	prediction options and present probabilities in image processing. • Lectures will provide students with an opportunity to understand the basic concepts and relate them to practical image processing ideas for a variety of mathematical problems. Accompanying practical sessions/visits/tutorials will enable them to apply their knowledge and integrate it with skills such as scientific calculations, communication, and report writing. • Provide an opportunity to develop problem-solving skills. • Provide an explanation of the relationship between physics and scientific applications. • Provide students with experience in writing scientific laboratory reports, research reports, and producing posters and presentations. • Provide students with an understanding of the relationship between image processing and how to work with it
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	.By the end of this unit, the student is expected to be able to: • Understand the meaning of image processing, its components, and how to use it in practical life. • Provide a detailed explanation of the practical application of image processing in all its branches. • Provide a detailed explanation of how image processing is applied in practice, how to address the problem mathematically, and how to interpret the results..
Indicative Contents المحتويات الإرشادية	This module will provide a basic understanding of the role of fundamental principles in image processing and their applications across all life stages. Students will participate in a series of lectures, practical lessons, and field visits that will enable them to master the connections between fundamental principles and mathematical sciences. Students will have the opportunity to apply the principles they have learned in practical contexts. Approximately 10 hours of practical training, with sessions in calculation, analysis, writing, and planning, will be available throughout the course to support students' training in these scientific areas

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم
Strategies	Computational modeling physics is the application of physics to mathematics. Uses concepts and physical procedures in mathematical prediction. Computational modeling physics plays a major role in all areas of life, and in improving some activities related to public affairs. Computational modeling physics encompasses areas such as electrophysiology, medical physics, and medical device physics. Other areas of interest in medical device physics include ionizing radiation measurement, modulus, sine waves, ultrasound, and other technologies that use concepts of physics as applied in medicine. Covers Modeling covers a wide range of aspects of life. The information presented here is intended to provide the practicing physicist with a resource of practical materials, as well as guidance for action in real-world situations. Furthermore, some subjects are particularly useful in supporting teaching programmers.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	109	**Structured SWL (h/w)**	7

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**91**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**6**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل		**200**	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	2 and 7	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 10	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction -:What Is an Image
Week 2	What Is Digital Image Processing
Week 3	Types of image processing
Week 4	Special Filter
Week 5	Image Quantization
Week 6	Gray Level Reduction
Week 7	IMAGE SHARPEING
Week 8	first month exam
Week 9	IMAGE SMOOTHING (LOW-PASS FILTERS)

Week 10	LOW-PASS FILTERING
Week 11	**HIGH-PASS FILTERING**
Week 12	Butterworth HPF
Week 13	Sources of noise appearing in the image
Week 14	Digital Image Compression Methods
Week 15	Compression ratio
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Lab 1:** Image processing with MATLAB
Week 2	**Lab2:** Types of digital images
Week 3	**Lab3:** image baske:
Week 4	**Lab4:** Conversions between digital image types
Week 5	**Lab5-:** image manipulation
Week 6	**Lab6:** color conver sisns
Week 7	**Lab7 :**imag statistics
Week 8	**Lab8** : imag noise

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1.** Image processing books **2** Introduction to Image Processing and Computer Software 3. Various websites and topics about image processing, questions	**Yes**

Recommended Texts		No
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A - Excellent**	امتياز	**90 - 100**	Outstanding Performance
	B - Very Good	جيد جدا	**80 - 89**	Above average with some errors
	C - Good	جيد	**70 - 79**	Sound work with notable errors
	D - Satisfactory	متوسط	**60 - 69**	Fair but with major shortcomings
	E - Sufficient	مقبول	**50 - 59**	Work meets minimum criteria
Fail Group (0 – 49)	**FX – Fail**	راسب (قيد المعالجة)	**(45-49)**	More work required but credit awarded
	F – Fail	راسب	**(0-44)**	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**Ordinary Differential Equations**	**Module Delivery**
Module Type	**Core**	☒ **Theory**
Module Code	COS-05	☒ Lecture
ECTS Credits	4	☒ Lab
SWL (hr/sem)	100	☐ Tutorial
		☐ Practical
		☐ Seminar

Module Level	2	Semester of Delivery	3
Administering Department	**Physics Department**	**College**	Type College Code

Module Leader	Name	**Firas Mahmood Hady**	e-mail	E-mail/ firas_1962@yahoo.com
Module Leader's Acad. Title		**Professor**	**Module Leader's Qualification**	.
Module Tutor	Assistant Lecturer**: Chia haseeb kareem**		e-mail	E-mail chiahaseeb@uodiyala.edu.iq
Peer Reviewer Name		Name	e-mail	E-mail
Scientific Committee Approval Date		3 / 9 / 2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. **The general objective: to raise the level of the student in mathematics in particular and in the educational process in general.** 2. **Acquisition of the skill in using the problem-solving method .. Community development** 3. **Identifying the impact of mathematics on human civilization development and emphasizing its importance in community service.** 4. **Introduce the student to how to deal with imaginary numbers, and understand that complex numbers are composed of a real part and an imaginary part.** 5. **Numbers in general are abstract mathematical concepts to carry out the operations of measuring, counting, arranging, classifying, etc.. Depending on the concepts that we want to represent and the operations that we need to do, we can find a set of numbers that are simpler or more efficient to**

	do the required work..
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. 1. Know the concept of differentiation. 2. 2. Knowing the methods of solving equations through derivation that includes the solution of the equation 3. 3. Complete understanding of logical concepts are the concepts that logic imposes on us. As for conventional concepts, they are concepts that we assume make computations possible or easy. 4. 4. Knowing the most important basic rules for solving equations by direct integration method

Indicative Contents
 	
المحتويات الإرشادية
	Indicative content includes the following.
	
	  Part A _
	
	.Defining the differential equation and identifying the most important ways to solve the differential equation [٢hours]
	
	. Basic rules of differentiation [2 hours]
	
	. Basic rules in integration and identify the importance of integration in solving ordinary differential equations [٢hours]
	
	.Define ordinary differential equations.[٢hours]
	
	 .Degree and order of ordinary differential equations [٢hours]
	
	.Methods for solving ordinary differential equations [٢hours]
	
	First month exam [2 hours]
	
	Part B -
	
	 .Methods for solving ordinary differential equations depending on the type of equation .[٢hours]
	
	  .Ordinary differential equations of the first and second order [2 hours]
	
	 .Solve all types of the ordinary differential equations using the different mathematical methods.[2 hours].
	
	Second month exam [2 hours]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	**The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in the exercises, while improving and expanding their**

critical thinking skills at the same time. This will be achieved through classes and interactive tutorials and by looking at simple problem solving which includes some activities of interest to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**26**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**2**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**4**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**0**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**30 Hours**		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

	Delivery Plan (Weekly Syllabus)
	المنهاج الاسبوعي النظري
	Material Covered
Week 1	Introduction and define the ordinary differential equations
Week 2	The general solution and the particular solution of the Differential Equations(DE)
Week 3	Find the DE from the general solution , particular solution
Week 4	Define the degree and the order of the ordinary differential equation
Week 5	Types of all the ordinary differential equations, solve DE by variable separable method and more mathematical solved examples.
Week 6	Solve the Linear DE of the first degree and more mathematical solved examples
Week 7	**Mid-term Exam 1**
Week 8	Solve the Exact DE and more mathematical solved examples
Week 9	Bernoulli equation and more mathematical solved examples
Week 10	Homogenous DE and more mathematical solved examples
Week 11	Solve the linear homogenous DE with the constant coefficients
Week 12	Solve the non – homogenous DE with the constant coefficient
Week 13	Solve the second degree DE by using D- operator and more mathematical solved examples
Week 14	Applications the DE(Differential Equations) in physics
Week 15	**Exam 2**
Week 16	Preparatory week before the final Exam
	Delivery Plan (Weekly Lab. Syllabus)
	المنهاج الاسبوعي للمختبر

Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas ' Calculus Early Transcendental 13 edition , by George B . Thomas , Jr. , 2014	Yes
Recommended Texts	Differential Equations Schaum , s outlines , 4th edition , 2014	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 – 49)	**F** – Fail	راسب	(0-44)	Considerable amount of work required

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Republic of Iraq

The Ministry of Higher Education

& Scientific Research

University:Diyala

College:Science

Department:Physics-Medical Physics

Stage: Fourth

Course Weekly Outline

Course Instructor	**Prof. Dr. Ziad Tariq Khodair** Assistant Lecturer **chia haseeb kareem**
E-mail	**ziad_tariq70@yahoo.com** **chiahaseeb@uodiyala.edu.iq**
Title	**Medical Instruments**
Course Objective	**-Teaching students the basic principles of Medical Instruments - Teaching studen to applications of Medical Instruments for instruments in hospitals**
Course Description	**Introduction in Medical Instruments, study of: principles of Centrifugation principles of Spectroscopy , Introduction to Complete Blood Count (CBC) Introduction to Blood pressure instrument**
Textbook	**Antique Medical Instruments by Elisabeth Bennion** **.**
References	**Medical Instruments and Devices: Principles and Practices by Steven Schreiner, Joseph D. Bronzino, Donald R. Peterson**

week	Date	Topics Covered	Notes
1	١٧/٩/2024	**Introduction to Medical Instruments**	
2	24/9/٢٠٢٤	**Centrifugation, Principles, Relative Centrifugal Force (RCF) , Centrifugation**	
3	1/10/2024	**Types of centrifuges, Operation of laboratory centrifuge, Uses of centrifuge, Care of Centrifuge**	
4	8/10/2024	**Introduction to Spectroscopy, UV-Vis Spectrophotometer, How does a UV-Vis spectrophotometer work**	
5	15/10/2024	**Applications of UV-Vis Spectroscopy, Advantages of UV-Vis Spectroscopy**	
6	22/10/2024	**Introduction to Complete Blood Count (CBC)**	
7	29/10/2024	**Blood composition, Red blood cell count, White Blood Cell (WBC) count, A CBC test usually includes**	
8	5/11/2024	**Introduction to Blood Pressure Measurement**	
9	12/11/2024	**Systolic pressure, Diastolic Pressure**	
10	19/11/2024	**Types of blood pressure instrument**	
11	26/11/2024	**Mercury sphygmomanometer**	
12	3/12/2024	**Aneroid sphygmomanometer Electronic sphygmomanometer**	
13	10/12/2023	**Advantages and Disadvantages of types of blood pressure instruments**	
14	17/12/2023	**Visit the hospital in the city of Baquba to see the most important medical equipment.**	
15	8/1/2025	**Review**	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="3" style="text-align:center">Module Information
معلومات المادة الدراسية٢</td></tr>
<tr><td>Module Delivery</td><td style="text-align:center">electronic of symmetry</td><td>Module Title</td></tr>
<tr><td>☒ Theory</td><td style="text-align:center">Core</td><td>Module Type</td></tr>
<tr><td>☒ Lecture</td><td style="text-align:center">PHY-212</td><td>Module Code</td></tr>
<tr><td>☒ Lab</td><td style="text-align:center">6</td><td>ECTS Credits</td></tr>
<tr><td>☐ Tutorial</td><td rowspan="3" style="text-align:center">150</td><td rowspan="3">SWL (hr/sem)</td></tr>
<tr><td>☐ Practical</td></tr>
<tr><td>☐ Seminar</td></tr>
<tr><td>3</td><td>Semester of Delivery</td><td>2</td><td>Module Level</td></tr>
<tr><td colspan="2">Type College Code</td><td>College</td><td></td><td>Administering Department</td></tr>
<tr><td colspan="2">zaidabdulhadi@uodiyala.edu.iq</td><td>e-mail</td><td>Zaid Abdulhadi Abed</td><td>Module Leader</td></tr>
<tr><td>Ms.C</td><td>Module Leader's Qualification</td><td>Lecturer</td><td>Module Leader's Acad. Title</td></tr>
<tr><td>E-mail</td><td>e-mail</td><td>Chia H.kareem</td><td>Module Tutor</td></tr>
<tr><td>E-mail</td><td>e-mail</td><td>Fatima .Mohammed</td><td>Peer Reviewer Name</td></tr>
<tr><td>1.0</td><td>Version Number</td><td>1 / 9 / 2024</td><td>Scientific Committee Approval Date</td></tr>
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<table>
<tr><td colspan="4" style="text-align:center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td></td><td>Semester</td><td>None</td><td>Prerequisite module</td></tr>
<tr><td></td><td>Semester</td><td>None</td><td>Co-requisites module</td></tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
1- Teaching the student the basic principles of physics 2- Preparing specialists in general physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the labor market in state institutions and industry sectors 3- Preparing an educated generation armed with science and adopting it as a sound basis for bringing about radical changes and putting scientific knowledge and scientific method in thinking, analyzing and adapting to the development of technologies in order to keep pace with the expansion of human needs. 4- -Providing an appropriate academic environment for study and research that enables the student to continue his higher studies and contribute to finding solutions to problems using appropriate and appropriate techniques. 5- Active participation in deepening and documenting the university's relationship with society through the implementation of advisory work, training and development of teaching and administrative cadres. 6- Teaching the student the basic principles of physics .	**Module Objectives** أهداف المادة الدراسية
1- Introduction to Electronics 2- Diodes and Applications 3 Special-Purpose Diodes 4- Bipolar Junction Transistors 5 -Transistor Bias Circuits 6- BJT Amplifiers 7- Power Amplifiers 8 -Field-Effect Transistors (FETs) 9 -FET Amplifiers and Switching Circuits 10- Amplifier Frequency Response 11-Thyristors 12 -The Operational Amplifier 13- Basic Op-Amp Circuits 14 -Special-Purpose Op-Amp Circuits 15- Active Filters 16 -Oscillators 17 -Voltage Regulators	**Module Learning Outcomes** مخرجات التعلم للمادة الدراسية

18- Basic Programming Concepts for Automated Testin	
. Indicative content includes the following:	**Indicative Contents** المحتويات الإرشادية

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

The main strategy that will be adopted in delivering the logic design module is to engage students actively in practical exercises to enhance their understanding and develop their critical thinking skills. The module will include a combination of classes, interactive tutorials, and hands-on experiments focused on sampling activities that capture students' interest. Through interactive classes, students will be introduced to the theoretical foundations of logic design, including explain digital system concept. express analog to digital conversion, use binary number system, realize conversion between various number systems, design fundamental digital systems, recognize logic gates, apply Boolean algebra, employ Karnaugh map for digital system optimization, develop combinational logic circuits such as adder, subtractor, encoder, decoder, multiplexer and demultiplexer. And recognize types of Flip-flops, design sequential logic circuits. Analyze fundamental digital systems, calculate input - output relationship in digital systems, and recognize state diagrams and tables, analyses sequential logic circuits. To reinforce learning and encourage active participation, interactive tutorials will be conducted. These tutorials will involve hands-on exercises where students will work with real-world design and apply different design techniques. This practical approach will help students grasp the practical implications of the theoretical concepts discussed in the classes. In addition to tutorials, simple experiments will be introduced to provide students with opportunities to explore various sampling activities. These experiments will focus on real-life scenarios and problems related to digital design . Students will be encouraged to think critically, analyze the results, and propose solutions based on their understanding of the concepts learned. The module will also emphasize the importance of collaboration and teamwork. Students will be encouraged to work together on projects and assignments, fostering a collaborative learning environment where they can exchange ideas and learn from each other's perspectives. Overall, the module's delivery approach aims to actively engage students, refine their critical thinking skills, and provide them with practical experiences in digital design . By combining theoretical knowledge with hands-on activities, students will develop a deeper understanding of logic design concepts and their applications in various fields.	**Strategies**

Student Workload (SWL)

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الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

</div>

5	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	79	**Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل
5	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	71	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل
200			**Total SWL (h/sem)** الحمل الدراسي الكلي للطالب خلال الفصل

Module Evaluation

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تقييم المادة الدراسية

</div>

Relevant Learning Outcome	Week Due	Weight (Marks)	Time/Number		
LO #1, #2 and #10, #11	2 and 7	10% (10)	2	**Quizzes**	**Formative assessment**
LO #3, #4 and #6, #7	2 and 10	10% (10)	2	**Assignments**	
All	Continuous	10% (10)	1	**Projects / Lab.**	
LO #5, #8 and #10	13	10% (10)	1	**Report**	
LO #1 - #7	7	10% (10)	2hr	**Midterm Exam**	**Summative assessment**
All	16	50% (50)	3hr	**Final Exam**	
		100% (100 Marks)	**Total assessment**		

Delivery Plan (Weekly Syllabus)

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المنهاج الاسبوعي النظري

</div>

Material Covered	
Introduction to Electronics	**Week 1**

Diodes and applications	**Week 2**
Special-Purpose Diodes	**Week 3**
Bipolar Junction Transistors (BJTs)	**Week 4**
exam of first month	**Week 5**
Transistor Bias Circuits	**Week 6**
BJT Amplifiers	**Week 7**
Power Amplifiers	**Week 8**
Field-Effect Transistors (FETs)	**Week 9**
FET Amplifiers and Switching Circuits	**Week 10**
exam of second month	**Week 11**
Thyristors	**Week 12**
Oscillators	**Week 13**
Basic Op-Amp Circuits	**Week 14**
Voltage Regulators	**Week 15**
final exam	**Week 16**

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
Material Covered	
Study of characteristics of Silicon diode in : 1. Forward bias 2. Reverse bias	**Week 1**
Study of characteristics of Zener diode in 1. Forward bias 2. Reverse bias	**Week 2**
Study of characteristics of Light emitting diode (LED) in 1. Forward bias 2. Reverse bias	**Week 3**

Study of Zener diode as a voltage regulator, when input voltage VIN is variable while Load resistance RL is fixed	**Week 4**
To study clamper circuits	**Week 5**
Transistor characteristics (CB NPN)	**Week 6**
Transistor characteristics (CE NPN)	**Week 7**
Transistor characteristics (CC NPN)	**Week 8**

	Learning and Teaching Resources	
	مصادر التعلم والتدريس	
Available in the Library?	**Text**	
Yes	• Thomas L. Floyd, Electronic Devices: Electron Flow Version, 9th edition, Pearson Education, Inc., Upper Saddle River, New Jersey, 2012	**Required Texts**
No	• 1. R. Boylestad., and L. Nashelsky, Electronic Devices and Circuit Theory. 11th edition, Pearson Education Limited, London, 2014. 2. Horowitz and Hill, The Art of Electronics, 2nd edition, Cambridge University Press, 1989. 3. A. Malvino, and D. J. Bates, Electronic principle, McGraw Hill, 7th edition, 2005	**Recommended Texts**
Electronic Devices - Electron Flow Version (2).pdf		**Websites**

	Grading Scheme			
	مخطط الدرجات			
Definition	**Marks %**	التقدير	**Grade**	**Group**
Outstanding Performance	90 - 100	امتياز	**A -** Excellent	**Success Group (50 - 100)**
Above average with some errors	80 - 89	جيد جدا	**B -** Very Good	
Sound work with notable errors	70 - 79	جيد	**C -** Good	

Fair but with major shortcomings	60 - 69	متوسط	**D -** Satisfactory	
Work meets minimum criteria	50 - 59	مقبول	**E -** Sufficient	
More work required but credit awarded	(45-49)	راسب (قيد المعالجة)	**FX** – Fail	**Fail Group**
Considerable amount of work required	(0-44)	راسب	**F** – Fail	**(0 – 49)**

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	**General physics**		**Module Delivery**	
Module Type	Core		☒Theory	
Module Code			☒Lecture	
ECTS Credits			☐Lab	
SWL (hr/sem)			☐Tutorial ☐Practical ☐Seminar	
Module Level	4	**Semester of Delivery**		2
Administering Department		**College**	College of Science	
Module Leader	Dr.Rudainah Ali Lateef	**e-mail**	Rudayna2000@yahoo,com	
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor		**e-mail**		
Peer Reviewer Name		**e-mail**		
Scientific Committee Approval Date	3 / 9 / 2024	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- Introducing students to the physics and its importance in human life 2 - Introduce the student to the importance of physics in terms of economic importance 3Introducing students to the use of physics in everyday life 4- Introducing students to the uses of physics in the medical, industrial and agricultural fields
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Definition of the physics 2. Definition of the types of physics and its properties 3. Students' knowledge of the use of physics 4. Identifying the applications of physics 5. study chemical physics
Indicative Contents المحتويات الإرشادية	Indicative content includes the following - Definition of the physics. [5 hrs] - Discussion of the types of physics and its properties. [10 hrs] - the methods to generate plasma. [10 hrs]. - Study of the applications of physics. [10 hrs].].

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted is to present this unit in theoretical lectures from the professor of the scientific subject, while encouraging students to participate in clarifying the topics through discussion among students with the use of means of clarification, including posters in addition to scientific films, with a description of recent reports of scientists in this field.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	1	10% (10)	Continuous	All
	Report	2	10% (10)	6 and 11	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	9	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	The tools of physics
Week 2	Laws of motion
Week 3	Motion in one dimension
Week 4	Work
Week 5	Energy
Week 6	Power
Week 7	Momentum
Week 8	Types of waves
Week 9	Velocity of waves
Week 10	Characterizing matter
Week 11	Thermal physics

Week 12	Temperature
Week 13	Ideal gas
Week 14	Pressure and fluids
Week 15	Exam
Week 16	

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	(Lecture notes for Physics 10154: General Physics I Hana Dobrovolny Department of Physics & Astronomy, Texas Christian University, Fort Worth, TX December 3, 2012	Yes
Recommended Texts		yes
Websites		

Grading Scheme				
مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings

	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		
Module Title	**Computer**	**Module Delivery**
Module Type		☒**Theory** ☒**Lecture** ☒**Lab** ☐Tutorial ☐Practical ☐Seminar
Module Code		
ECTS Credits		
SWL (hr/sem)		
Module Level		**Semester of Delivery**	
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	**Rafid Mahmood**	**e-mail**	Rafidmahmood26@gmail.com
Module Leader's Acad. Title	Assistant lecture	**Module Leader's Qualification**	M.Sc
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	1 / 9 / 2024	**Version Number**	

Relation with other Modules		
العلاقة مع المواد الدراسية الأخرى		
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The course aims to provide student with basic computer skills to enrich their in intellectual and technical in the fields of computer science and their various applications as well as the definition of student programs that support its academic collection.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To define and understand foundation computer. 2. This course deals with the basic concept of computer. 3. To define operating system. 4. To define security of computer.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical side This course deals with the basic concept of computer, student can Understand foundation computer, operating system and security of computer. Part B – practical side The course aims to provide student with basic computer skills to enrich their in intellectual and technical in the fields of computer science: student can deal with computer by understand use of operating system and their various applications such as Microsoft office as well as the definition of student programs that support its academic collection. Home Works and Assignments Attendance is mandatory. Every class is important. All deadlines are hard. Under normal circumstances, late work will not be accept. Students are required to take all the tests. No make-up tests will be give under normal circumstances. Any form of cheating on exams/assignments/quizzes is subject to serious penalty Attendance 75% attendance is mandatory. Latecomers will be marked as absent

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering the computer module is to engage students actively in practical exercises to enhance their understanding and develop their critical thinking skills. The module will include a combination of classes, interactive tutorials, and hands-on experiments focused on sampling activities that capture students' interest.

Through interactive classes, students will be introduced to the foundations of computer, including explain operating system, security of computer and application programs.

The module will also emphasize the importance of collaboration and teamwork. Students will be encouraged to work together on projects and assignments, fostering a collaborative learning environment where they can exchange ideas and learn from each other's perspectives.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	120	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	8	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	120		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment		100% (100 Marks)			

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered

Week 1	Introduction, Lifestyle of them computer, Computer generations.
Week 2	Electrical Computer, Data and Information, Computer features, Computer use areas.
Week 3	Computer components, computer features, computer types, Area of using computer.
Week 4	Computer components: Hardware and software
Week 5	Computer preparation systems, factors that must be observe when you buy a computer, the main features of PC.
Week 6	Computer security.
Week 7	Electronic penetration, malicious software, protection from penetration.
Week 8	Definition of operating systems, operating system functions.
Week 9	Operating system objectives, classification of operating systems.
Week 10	Examples of some operating systems, Windows 10
Week 11	Install the system, features, and desktop components.
Week 12	Start menu, taskbar notification area, folders and icons.
Week 13	Windows operations.
Week 14	Control Panels.
Week 15	Cases and preparations in computer.
Week 16	**Preparatory week before the final Exam**

	Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر
	Material Covered
Week 1	Lab 1: Introduction, Computer components: Hardware.
Week 2	Lab 2: Definition of operating systems, Windows 10, operating system functions, Install the system, features, and desktop components.
Week 3	Lab 3: Start menu, taskbar notification area, folders and icons, Control Panels, Cases and preparations in computer.
Week 4	Lab 4: Learn Microsoft Word2010, the main interface.
Week 5	Lab 5: Word Art, General setting.
Week 6	Lab 6: Text, Keyboard shortcuts.
Week 7	Lab 7: Graphics, Tables.
Week 8	Lab 8: Learn Microsoft Excel2010, the main interface.
Week 9	Lab 9: Create table, Create Series, Create functions.
Week 10	Lab 10: save file, printing setting.

Week 11	Lab 11: Data Management, Objects Management.
Week 12	Lab 12: : Learn Microsoft powerpoint2010, the main interface, Slid setting, Custom Animation
Week 13	Lab 13: file storage formats.
Week 14	Lab 14: Preparation of a multi-slide project, preparation Interactive show.
Week 15	Lab 15: Preparation photo album.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Computer basics and application	Yes
Recommended Texts		
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A - Excellent**	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX – Fail**	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="3" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td>Modern Physics</td><td rowspan="4">Module Delivery</td></tr>
<tr><td>Module Type</td><td>Core</td></tr>
<tr><td>Module Code</td><td>PHY-232</td></tr>
<tr><td>ECTS Credits</td><td>6</td></tr>
</table>

Module Delivery:
- ☒ Theory
- ☒ Lecture
- ☒ Lab
- ☒ Tutorial
- ☐ Practical
- ☐ Seminar

SWL (hr/sem)	**150**		
Module Level	2	**Semester of Delivery**	4
Administering Department	Physics	**College**	Science
Module Leader	د.ندى	**e-mail**	الايميل@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	MS.C
Module Tutor	Zaid Abdulhadi Abed	**e-mail**	zaidabdulhadi@uodiyala.edu.iq
Peer Reviewer Name	ست زينب	**e-mail**	الايميل
Scientific Committee Approval Date	3 / 9 / 2024	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى		
Prerequisite module	231	**Semester**	3
Co-requisites module	Non	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	Modern physics refers to physics developed in the 20th century including the special theory of relativity, quantum mechanics, atomic and nuclear physics, particle physics and cosmology. While classical physics is generally concerned with matter and energy on the normal scale of observation, much of modern physics is concerned with the behavior of matter and energy under extreme conditions or on the very large (the universe) or very small (sub-atomic level) scale.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the Schrödinger equation for hydrogen atom 2. Give the knowledge of the separation variables for Schrödinger equation. 3. Understanding the meaning of the quantum numbers of the hydrogen atom and then generalizing it for atoms has more electrons. 4. Explain how the quantum numbers play rules in Zeeman effect and electronic spectrum. 5. Give knowledge about the molecular depending on the formation motion and bands. 6. Give the principles of the Statical mechanics (Maxwell-Boltzmann Distribution and Fermi – Dirac Distribution) 7. Provide the information of the solid state physics 8. give a wide vision about the nuclear physics (form, size, radius and the mass of nucleus in addition to nuclear models)
Indicative Contents المحتويات الإرشادية	Indicative content includes the following:
Learning and Teaching Strategies
استراتيجيات التعلم والتعليم
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their ability modern physics and the relationship with real-life problem. Students understand the basic concepts, analytic skills and numeracy skills. Students also practice to

	explain and analyze the natural phenomena and technology both qualitatively and quantitatively that exist in the environment by using basic physics concepts and apply it to everyday life.		

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	4 and 10	LO #1, #2, #3 and #4, #5, #6, #7, #8
	Assignments	2	10% (10)	5 and 12	LO #1, #2, #3 and #4, #5, #6, #7, #8
	Project	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO #1, #2, #3 and #4,

					#5, #6, #7, #8
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #6
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week assignment	Material Covered
Week 1	**Chapter One: Quantum Mechanics for Hydrogen Atom** Schrodinger equation for hydrogen atom, separation of variables and Quantum numbers
Week 2	Principal quantum number, orbital quantum number and Magnetic Quantum Number
Week 3	Electronic orbits, Zeeman phenomenon and selection roles
Week 4	**Chapter two: Molecular Physics** Molecular formation, hybrid orbits and carbon-carbon bonds
Week 5	Rotational energy levels, vibrational energy levels and molecular electronic spectra
Week 6	**Chapter three: Statistical Mechanics** Statistical distribution lows, phase space and Maxwell-Boltzmann distribution
Week 7	**Midterm Exam**
Week 8	Constants Evaluation, black – body radiation, Fermi – Dirac distribution and Laser ray

Week 9	Uncertainty principles, applications of uncertainty principles, the wave-particles duality and Alpha Particle
Week 10	**Chapter four: Solid State Physics** Crystalline and Amorphous Materials and Ionics Crystals
Week 11	Covalent crystals, Van Der Waals forces, metallic Bond
Week 12	Band theory of solid materials, Fermi energy, electrons-energy distribution
Week 13	**Chapter five: Nuclear Physics** Atomic masses, neutrons and stable nuclei
Week 14	Nuclear Size, Shapes and Spectra
Week 15	Binding energy, deuterons and nuclear models

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
Week assignment	**Material Covered**
Week 1	Photoelectric experiment
Week 2	Ballmer series experiment
Week 3	Electron diffraction experiment
Week 4	Midterm exam
Week 5	Maltese cross experiment
Week 6	Determination of $\frac{e}{m}$ (Schuster method)
Week 7	Final exam

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	Arthur Beiser (2003). Concepts of modern Physics. McGraw companies, New York , USA.	Yes
Recommended Texts	R.B. Singh (2009). Introduction to Modern Physics. NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS 4835/24, Ansari Road, Daryaganj, New Delhi - 110002	No
Websites		

	Grading Scheme مخطط الدرجات			
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group **(50 - 100)**	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group **(0 – 49)**	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			

			Module Delivery
Module Title	**Electricity**		
Module Type	**Core learning activity**		☒ Theory
Module Code	PHY-111		☒ Lecture
ECTS Credits	8		☒ Lab
			☐ Tutorial
SWL (hr/sem)	200		☐ Practical
			☐ Seminar

Module Level	UGI	**Semester of Delivery**		1
Administering Department		**College**		
Module Leader	Nada Ismael Ibrahim	**e-mail**	nadaibrahim@uodiyala.edu..iq	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.	
Module Tutor		**e-mail**		
Peer Reviewer Name		**e-mail**		
Scientific Committee Approval Date	1 / 9 / 2024	**Version Number**		

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

	أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of the electricity through the application of techniques. 2. To understand the properties of electric charges 3. This course deals with the basic concept of the electricity. 4. To understand the electric fields.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Basic Concepts of electricity principles. 2. Coulomb́s law 3. Classification of substances in terms of their ability to conduct electric charge 4. Discuss the Charging by induction . 5. Describe the electric field of a continuous charge distribution. 6. Define electric dipole. 7. Describe Gauss's law 8. Discuss the applications of Gausśs law 9. Define the electric flux 10. Describe the potential difference in a uniform electric field. 11. Define the capacitance 12. Explain the Parallel-Plate Capacitor.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Properties of electric charges, Insulators and conductors, charging by induction, Coulomb'S law, the electric field, electric field of a continuous charges distribution[8hrs] Electric flux, Gauss's law, conductors in electrostatic equilibrium[6hrs] Potential difference and electric potential, potential difference and electric potential , electric potential and potential energy due to point charges, electric potential due to

	continuous charge distributions, electric potential due to a charged conductor[8hrs]
	Calculating capacitance, Parallel-Plate Capacitors, combinations of capacitance, parallel combination, series combination, capacitors with dielectrics, types of capacitors [8hrs].

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	106	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	94	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation				
تقييم المادة الدراسية				
	Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**

Formative assessment	**Quizzes**	2	10% (10)	3 and 6	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects /	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Properties of electric charges
Week 2	Conductors and insulator
Week 3	Coulomb's law
Week 4	The Electric Field
Week 5	Field due to continuous distribution of charge
Week 6	Lines of force
Week 7	Mid-term Exam
Week 8	Gauss's law
Week 9	Application of Gauss's law
Week 10	Potential difference
Week 11	Potential and charge distribution
Week 12	Electric potential due to a charged conductor
Week 13	Definition of capacitance
Week 14	Parallel-Plate Capacitor
Week 15	Capacitors with dielectric

Week 1٦	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Electricity and Magnetism by Francis Weston Sears**	Yes
Recommended Texts	**Basic Electricity by Milton Gussow**	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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	F – Fail	راسب	(0-44)	Considerable amount of work required

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TEMPLATE FOR COURSE SPECIFICATION

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	College of Science /University of Diyala
2. University Department/Centre	physics
3. Course title/code	1st course
4. Modes of Attendance offered	Solid state physics
5. Semester/Year	Semester
6. Number of hours tuition (total)	30 hours
7. Date of production/revision of this specification	3 / 9 / 2024

8. Aims of the Course
1- Urging students to complete the course plan
2- Commitment to study vocabulary as a curriculum within a time-limited study plan
3- Updating the vocabulary by the teaching staff to less than 15% annually.
4- Monitoring the extent of adherence to the study plan

9· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Cognitive goals.
. A1- Understand and comprehend the material in terms of the required (programmed) vocabulary A-2- power point A-3- Use of the board and pen A-4- Preparing explanatory aids A-5- Preparing brief reports for some topics
B. The skills goals special to the course. B1 - Skills according to the student's ability B2 - high thinking skills B3 - Criticism in learning
Teaching and Learning Methods
The method of the semester and final exams. Homework. Activity during the lecture.
Assessment methods
The method of the semester and final exams. Homework. Activity during the lecture.

C. Affective and value goals
   C1- Brainstorming
   C2- Logical analysis of problems and their solution

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)
D1 - verbal communication D 2- Teamwork
D3 - Analysis and application D 4- Time management
D 5- Planning and Organizing

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	Lattice dynamics: Intoduction	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
2	2	Vibrational modes of linear monoatomic lattice	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
3	2	Vibrational modes of linear diatomic lattice	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
4	2	Thermal properties of solids	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
5	2	Classical models of lattice energy: classical models	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
6	2	the first exam	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
7	2	Enstien model	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
8	2	Debye model	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
9	2	Band theory	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
10	2	Periodic potential	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
11	2	Bloch function	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
12	2	Density of electronic state and effective mass	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
13	2	The concept of positive gaps	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
14	2	Electrical properties of solids	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
15	2	second exam	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework

11. Infrastructure	
1. Books Required reading:	فيزياء الحالة الصلبة: يحيى نوري الجمال فيزياء الحالة الصلبة–الجزء الأول:د.يسري مصطفى
2. Main references (sources)	Introduction to Solid State Physics :Charles Kittel, paul McEuen
A- Recommended books and references (scientific journals, reports…).	Solid state physics References
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
Familiarity with all that is new and new in teaching and learning strategies. The application of some modern teaching strategies. Update used software annually.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	College of Science /University of Diyala
2. University Department/Centre	physics
3. Course title/code	Second course
4. Modes of Attendance offered	Solid state physics
5. Semester/Year	Semester
6. Number of hours tuition (total)	30 hours
7. Date of production/revision of this specification	4 / 9 / 2024
8. Aims of the Course	
1- Urging students to complete the course plan	
2- Commitment to study vocabulary as a curriculum within a time-limited study plan	
3- Updating the vocabulary by the teaching staff to less than 15% annually.	
4- Monitoring the extent of adherence to the study plan	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .
. A1- Understand and comprehend the material in terms of the required (programmed) vocabulary A-2- power point A-3- Use of the board and pen A-4- Preparing explanatory aids A-5- Preparing brief reports for some topics
B. The skills goals special to the course. B1 - Skills according to the student's ability B2 - high thinking skills B3 - Criticism in learning
Teaching and Learning Methods
The method of the semester and final exams. Homework. Activity during the lecture.
Assessment methods
The method of the semester and final exams. Homework. Activity during the lecture.

C. Affective and value goals
  C1- Brainstorming
   C2- Logical analysis of problems and their solution

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
D1 - verbal communication D 2- Teamwork
D3 - Analysis and application D 4- Time management
D 5- Planning and Organizing

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	Magnetic properties of matter	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
2	2	Magnetization current	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
3	2	Magnetic density	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
4	2	Magnetic permeability and susceptibility	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
5	2	Diamagnetic materials	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
6	2	the first exam	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
7	2	Paramagnetic materials	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
8	2	Ferromagnetic and ferrimagnetic materials	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
9	2	Dielectric properties	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
10	2	Dielectric materials classifications	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
11	2	Electric polarization	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
12	2	Dielectric loss	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
13	2	Breakdown of dielectric	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
14	2	Piezoelectric materials	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework
15	2	second exam	Solid state physics	The blackboard and the data show	Monthly and daily exams and homework

11. Infrastructure	
1. Books Required reading:	فيزياء الحالة الصلبة: يحيى نوري الجمال فيزياء الحالة الصلبة–الجزء الأول: د. يسري مصطفى
2. Main references (sources)	Introduction to Solid State Physics: Charles Kittel, paul McEuen
A- Recommended books and references (scientific journals, reports…).	Solid state physics References
B-Electronic references, Internet sites…	

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Familiarity with all that is new and new in teaching and learning strategies. The application of some modern teaching strategies. Update used software annually.