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

2025

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-c

Academic Program Description Form

University Name: Wasit

Faculty /Institute: College of Education for Pure Science

Scientific Department: Physics

Academic or Professional Program Name: Bachelor

Final Certificate Name: Bachelor of Education in Physics Science

Academic System : Annual

Description Preparation Date: 2024-2025

File Completion Date: 2024-2025

Signature:
Head of Department Name:
Lec. Ali Abed Jaber
Date: 3-3-2025

Signature:
Scientific Associate Name:
Assist. Prof. Mahdi Alwan Abood
Date: 3-3-2025

Assist Prof. Dr.Mahdi Alwan Al-Quraishi
Asst Dean for Academic Affairs
& Graduate Studies

The File is Checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Dte: 3/3/2025

Signature:

3/3

Approval of the Dean

Prof.
Dr.Ali H. Shuaa Al-Taie
Dean of Education College
for Pure Science

1. Program Vision

The Department of Physics aspires to leadership and excellence in the field of physical science education studies and achieving quality standards and programmatic accreditation, making it a distinguished academic and research department at the local, Arab, regional and global levels. All of this is in order to contribute to the progress of the country, the development of society, and reaching the ranks of reputable international colleges.

2. Program Mission

The department aims to achieve its goals by preparing competent graduates who have the skills and information in various physics disciplines, which qualifies them to work in the country's scientific, educational and research institutions and serve community issues.

3. Program Objectives

1 - Preparing qualified students to teach middle and middle school students
2- To prepare students familiar with the educational methods of teaching
3- Graduate students should be familiar with the basic concepts of physics
4- Students must be qualified to complete postgraduate studies to provide universities and institutes with teaching staff
5- Activating mechanisms for joint cooperation and openness to various universities and educational institutions at the local, regional and international levels in a way that includes all components of the educational system.
6- Work with other college departments to enter international classifications.
7. Embracing distinguished and distinguished students and motivating and encouraging them in order to become future scientific leaders, whether as teachers or researchers.
8. Working to improve and develop the capabilities and skills of faculty members and all employees in the college to ensure access to comprehensive quality management in the scientific and administrative fields.
9. Developing the laboratories of the Physics Department in line with the quality of the laboratories.

4. Program Accreditation

This has not happened yet, as the program accreditation standards for educational colleges were approved on 2/21/2024, according to the letter No. C D/A 905 on 2/22/2024.

5. Other external influences

nothing

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	8	16	%8.89	Basic + optional
College Requirements	10	34	%18.89	optional
Department Requirements	21	122	%67.78	Basic
Summer Training	1	4	%2.222	Basic
Other	1	4	%2.222	Basic

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
The first		Mechanics	3	2
The first		Heat and properties of the material	2	
The first		Electric and Magnetism I	3	2
The first		Mathematics I	3	
The first		Fundamentals of Education	2	
The first		Developmental and Educational Psycholohy	2	
The first		Computer I	1	
The first		Arabic Language	1	
The first		English Language	1	
The first		Democracy and Human Rights	1	
Second		Optics	3	2
Second		Astronomy	2	

Second		Electric and Magnetism II	**2**	**2**
Second		Mathematics II	**3**	
Second		Sound and Wave Motion	**2**	
Second		Computer II	**1**	
Second		Secondary Education and Educational Administration	**2**	
Second		Developmental psychology	**2**	
Second		Fundamentals of Scientific Research	**2**	
Second		Arabic Language	**1**	
Second		English Language	**1**	
Second		Baath Regime Crimes in Iraq	**1**	
Third		Atomic and Molecular Physics	**3**	**2**
Third		Thermodynamic	**3**	
Third		Electronics	**3**	**2**
Third		Analytical Mechanics	**3**	
Third		Complex Function	**2**	
Third		Psychological Guidance and Psychological heat	**2**	
Third		Curriculum methods of teaching	**2**	
Third		Optional	**2**	
Fourth		Nuclear Physics	**3**	
Fourth		Laser	**2**	
Fourth		Electromagnetic Theory	**3**	
Fourth		Quantum Mechanics	**3**	
Fourth		Sold state Physics	**3**	
Fourth		Measurement and Evaluation	**2**	
Fourth		Practical education	**1**	
Fourth		Research project	**2**	
Fourth		Demonstration instuments Lab		**2**

8. Expected learning outcomes of the program

Knowledge	
A1: Technical knowledge in the fields of physical sciences A2: Understanding practical applications of physical sciences	A1: Providing students with in-depth knowledge in various fields of physical science, such as analytical mechanics, electromagnetism, thermodynamics, and other physical sciences. A2: Principles of physics play a crucial role in understanding and developing technology. Where physics principles can be

A3: Teamwork and communication skills A4: Providing students with teaching, educational guidance, and classroom management skills	applied in the field of technology: electronic circuit design. A3: The Department of Physics aims to provide graduates with scientific skills in the theoretical and applied fields so that graduates can learn about the importance and how to use physical devices and their uses in multiple fields. A4: Providing students with the necessary information about teaching strategies, methods, and methods, and providing them with teaching skills such as planning, implementation, evaluation, and time management.
Skills	
B1: Skills and abilities of a graduate of the physics program B2: Linking physical theories and their applications in practical aspects. B3: Personal skills and responsibility B4: Cognitive skills	B1: Identifying skills that support the professional development of physics teachers in the way of learning and enriching the educational field in the field of discovering the latest digital technologies, which opens multiple horizons of knowledge and adapts them to the learner's needs and education styles. B2: Linking theoretical and practical aspects in the fields of materials science and solid state physics and how to deal with laboratory equipment that is used in studying materials physics. B3: Learn independently, work as a team, and recognize the work of others. B4: Apply their knowledge and understanding to solve qualitative and quantitative problems of a familiar and unfamiliar nature, implement and analyze the results of an experimental test, and draw valid conclusions.
Ethics	
C1: Adherence to professional ethics C2: Commitment to scientific values in the physical sciences C3: Integrity and ethics C4: Knowledge and learning	C1: Students are encouraged to understand and apply professional ethical values in the field of physical sciences, such as integrity, respect, responsibility, and protection of privacy and security. C2: Explaining the importance of scientific values and that they are one of the most important responsibilities of education, and explaining the importance of scientific values in confronting negative messages received through modern means of communication. C3: The program is concerned with promoting ethical values and integrity in the field of physical sciences, and teaches students the importance of ethical rules and correct behavior in the field of technology. C4: The program enhances the value of knowledge and learning by providing an educational environment that encourages the acquisition of knowledge and the development of skills in multiple areas of physical science

9. Teaching and Learning Strategies

The teaching and learning strategies and methods adopted in implementing the program are:
1- Active learning and participation
2- Project learning
3- Cooperative learning
4- Problem-based learning
5- Lecture method using technology for learning
6- Stimulate curiosity and exploration

7- Laboratory teaching strategies

10. Evaluation methods

1- Monthly exams
2- Daily exams
3- Group projects
4- Reports

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Assist. Prof. Mahdi Alwan Abood					√	
Lac. Ali Abed Jaber	physics	general physics			√	
					√	
					√	
Assist. Prof. Nadia Naeema Dhaher	general physics	Material physics				√
Assist. Prof. Dr. Najlaa Jerjack Abdullah	general physics	Material physics				√
					√	
					√	
					√	
					√	
					√	

					√	
					√	
					√	
					√	

Professional Development
Mentoring new faculty members
1- Development and training programs 2- Guidance and accompaniment programs 3- Participation in workshops in the field of modern teaching methods 4- Academic guidance
Professional development of faculty members
1- Needs analysis 2- Implementing training programs and workshops 3- Applying modern strategies in teaching 4- Monitor and evaluate performance 5- Evaluate feedback and support

12. Acceptance Criterion

1- Admission is centralized through the Ministry of Higher Education and Scientific Research
2- Parallel acceptance channel
3- Admission channel for early teachers

13. The most important sources of information about the program

- The university and college website
- Ministry of Higher Education and Scientific Research website
- College library or university central library

14. Program Development Plan

Applying program accreditation standards for educational colleges

Program Skills Framework																
Required Learning Outcomes from the Program																
Year/Level	**Course Code**	**Course Name**	**Core or Elective**	**A1**	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**
First Year		Mechanics	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Heat and Properties of Matter	Core	√	√	√	√								
		Electricity and Magnetism	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Mathematics	Core	√	√	√	√				√	√	√	√	
		Foundations of Education	Elective	√	√	√	√	√	√	√	√				
		Educational Psychology	Elective	√	√	√	√	√	√	√	√				
		Computers	Core	√	√	√	√				√	√	√	√	
		Arabic Language	Elective	√	√	√	√								
		English Language	Elective	√	√	√	√								
		Human Rights and Democracy	Elective	√	√	√	√								

Program Skills Framework																
Required Learning Outcomes from the Program																
Year/Level	**Course Code**	**Course Name**	**Core or Elective**	**A1**	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**
		Statistics	Elective	√	√	√	√								
Second Year		Optics	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Astronomy	Core	√	√	√	√	√	√	√	√				
		Electricity and Magnetism	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Mathematics	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Acoustics and Wave Motion	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Fundamentals of Scientific Research	Core	√	√	√	√	√	√	√	√				
		Educational Administration and Secondary Education	Elective					√	√	√	√				
		Developmental Psychology	Elective					√	√	√	√				
		Computers	Elective	√	√	√	√				√	√	√	√	
		English Language	Elective	√	√	√	√								

Program Skills Framework																
Required Learning Outcomes from the Program																
Year/Level	**Course Code**	**Course Name**	**Core or Elective**	**A1**	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**
		Crimes of the Defunct Ba'ath Party	Elective	√	√	√	√								
Third Year		Electronics	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Thermodynamics	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Complex Functions	Core	√	√	√	√				√	√	√	√	
		Atomic and Molecular Physics	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Analytical Mechanics	Core	√	√	√					√	√	√	√	
		Educational Guidance and Mental Health	Elective	√	√	√	√								
		Curriculum and Teaching Methods	Core	√	√	√	√				√	√	√	√	
Fourth Year		Nuclear Physics	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Laser	Core	√	√	√	√				√	√	√	√	
		Electromagnetic Theory	Elective	√	√	√	√				√	√	√	√	
		Quantum Mechanics	Core	√	√	√	√				√	√	√	√	

Program Skills Framework																
Required Learning Outcomes from the Program																
Year/Level	**Course Code**	**Course Name**	**Core or Elective**	**A1**	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**
		Solid State Physics	Core	√	√	√	√	√	√	√	√	√	√	√	√
		Research Project	Core	√	√	√	√				√	√	√	√	
		Educational Laboratory	Elective	√	√	√	√	√	√	√	√	√	√	√	√
		Measurement and Evaluation	Core	√	√	√	√				√	√	√	√	
		Practical Training	Core	√	√	√	√	√	√	√	√	√	√	√	√

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

Course Description Form

1. Course Name:	
Classic mechanics	
2. Course Code: PHM103	
3. Semester / Year:	
2024_2025	
4. Description Preparation Date:	
2025/2/1	
5. Available Attendance Forms:	
My attendance is mandatory	
6. Number of Credit Hours (Total) / Number of Units (6)	
hours 90 hours 3	
7. Course administrator's name (mention all, if more than one name)	
PHD. lecturer alia624@uowasit.edu.iq :email ALI ABED JABER	
8. Course Objectives	
Course Objectives	Students are familiarized with the general and specific principles of classical mechanics in motion and its types, along with the interpretation of the laws related to it. • Providing students with the scientific skills to deal with mechanical problems and how to benefit from and deal with them in different situations. • Explain and illustrate real-life examples of classical mechanics. • Urging students to possess scientific information related to mechanics and apply it

	now and in the future when faced with any problem. • Urging students to acquire various modern teaching skills in explaining mechanical topics and thus acquiring Experience in dealing with various physics topics

9. Teaching and Learning Strategies

Strategy	• Giving scientific lectures on understanding classical mechanics • Oral and short exams through discussion examples related to the topic • Written exams to refine what students have learned. • Classical mechanics describes the motion of very small (microscopic) bodies from the beginning Projectiles include machines and astronomical objects such as planets, galaxies, spaceships, and stars. • Study Newton's laws of motion • The study of the behavior of most “natural” things.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Gaining knowledge in understanding the meaning of movement in one dimension and how to apply it to movement in two or three dimensions	Measurements and movement in one dimension	My presence	General questions, discussion, and problem solving
2	3	Gaining knowledge in understanding the meaning of movement in one dimension and how to apply it to movement in two or three dimensions	Movement is in one dimension	My presence	General questions and discussion or exam

3	3	Understand the meaning of vector and scalar quantities	Vector and scalar quantities	My presence	General questions, discussion, and problem solving
4	3	Understand numerical and cross multiplication	Numerical and vector multiplication	My presence	oral test
5	3	Understanding motion in two dimensions	Motion in two dimensions and derivation of its laws	My presence	General questions and problem solving
6	3	Movement in two dimensions Shells	Movement in two dimensions	My presence	solving equations
7	3	A monthly written exam	evaluation	My presence	Monthly in all previous lessons
8	3	Definition of Newton's laws of motion and when to use them in different situations	Definition and derivation of Newton's laws	My presence	oral test
9	3	Dealing with the laws of motion in the presence of friction	Friction and applied frictional forces	My presence	oral test
10	3	Definition of regular and irregular circular motion and derivation of its laws	Circular motion	My presence	Solve related issues
11	3	Understanding gravity	Circular motion	My presence	Complete the solution of related issues
12	3	Understanding work and energy and derivation of laws	Work and energy	My presence	Solve related issues
13	3	Understanding the laws Preservation	Law of conservation of energy	My presence	Solve related issues
14	3	Understanding linear momentum and linear momentum-impulse	Linear momentum, thrust, and collisions	My presence	Solve related issues

		theory			
15	3	Understanding linear momentum and the theory of linear momentum-thrust and collisions	Linear momentum, thrust, and collisions	My presence	Complete the topic and solve the problems
16	3	A monthly written exam	evaluation	My presence	A monthly exam in all previous subjects
17	3	What is rotational motion, its laws, and its connection to translational motion	Rotary movement	My presence	Solve related issues
18	3	Understanding rotational kinetic energy and moment of inertia	Rotary movement	My presence	Solve related issues
19	3	Torque and rigid body	Rotary movement	My presence	Solve related issues
20	3	A monthly written exam	evaluation	My presence	A monthly exam in all previous subjects
21	3	Linear momentum Theory- Payment	Induction-impetus theory	My presence	Solve related issues
22	3	Rotation of solid bodies	Work in rotational motion, Rotational kinetic energy. Inertia, Newton's Laws of rotational motion,	My presence	Solve Related issues
23	3	Rotation of solid bodies	The relationship between rotational motion variables, finding the moment of inertia of some bodies (cylinder, ball, ring...), problems.	My presence	Solve Related issues
24	3	A monthly written exam	evaluation	My presence	A monthly exam in all

					previous subjects

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12. Learning and Teaching Resources	
1 - Classical Mechanics for Physics Graduate Students , ERNESTO CORINALDESI , 1998 . 2 - Classical Mechanics , R. DOUGLAS and GOREGE , 2006 .	Required prescribed books (Methodology, if any)
1 - Physics for Scientists and Engineers with modern physics , SERWAY and JEWETT , 9 Edition , 2014 . 2- University Physics by Francis W. Sears, Mark W. Zemanseky and Hugh D. Young, 1982. 3- Introduction to Physics by Jojn D.Cutnell, Kenneth W.Johnson 8th Ed.,2010	Main references (sources)
1- Classical Mechanics by Herbert Goldstein, 2002. 2- Classical Mechanics by Michael Cohen, 2014. 3- Classical Mechanics by Mahmoud Hamza Dahi, 2020.	Recommended supporting books and references (scientific journals, reports....
1- Educational Physics Network 2- Al-Farid website in physics 3- NASA website in Arabic for physics	electronic references, Internet sites

Course Description Form

13. Course Name:
Heat Physics and Properties of Matter
14. Course Code:
PHHM105
15. Semester / Year:
2024-2025
16. Description Preparation Date:

07/11/2024
17. Available Attendance Forms:
Daily Attendance
18. Number of Credit Hours (60) / Number of Units (4)
2 Theoretical Hours
19. Course administrator's name (mention all, if more than one name)
lecturer Dr. Nadia Naeema nanaeema@uowasit.edu.iq

20. Course Objectives

Course Objectives	• Introducing students to the subject of heat and properties of matter and their role in understanding physics principles and daily life. • How to apply this knowledge to address everyday situations in education, family, and society. • Enabling students of Colleges of Education for Pure Sciences to appreciate the value and significance of physics, particularly heat, in the history of physics, and preparing hem for teaching careers in primary, middle, and high schools as well as research laboratories within governmental institutions. topics

21. Teaching and Learning Strategies

Strategy	**Cognitive Objectives:** A-1: Understanding heat and properties of matter, their emergence, and their necessity in engineering and technological applications, as well as exploring their methods, fields, and theories.

	A-2: Understanding laws, their standards, conditions, the crises they undergo, and their benefits to society. A-3: Recognizing different temperature measurement scales. A-4: Understanding the mechanical properties of materials. A-5: Understanding the magnetic and electrical properties of materials. A-6: Recognizing the fourth state of matter: plasma. **Skills-Based Objectives:** B-1: Providing students with knowledge of heat and properties of matter, allowing them to transform this knowledge into actions when responding to specific problems. B-2: Providing students with knowledge of heat and its determining factors, enabling them to eliminate constraints and achieve personal and environmental compatibility.

22. Course Structure

Week	Hours	Learning Outcomes	Unit / Topic Name	Learning Method	Assessment Method
1-4	8	Gaining knowledge in heat physics and its role in human civilization; identifying thermometers and heat transfer mechanisms	Temperature Measurement - Types of Thermometers - Thermal Expansion - Heat Transfer Methods	Blackboard, Display Screen, E-learning	Daily oral and written exams
5-8	8	Understanding energy sources and the first law of thermodynamics	Heat Energy Sources - Specific Heat - First Law of Thermodynamics	Blackboard, Display Screen	Daily oral and written exams
9-12	8	Differentiating between ideal and real gases	Real and Ideal Gases - Kinetic Theory of Gases - Relationship between Cv and Cp	Blackboard, Display Screen	Daily oral and written exams
13-15	6	Understanding density and viscosity	Density and Specific Weight - Bernoulli's Equation - Surface Tension - Viscosity	Blackboard, Display Screen	Daily oral and written exams
16	2	Midterm Exam	On-Site Examination	Exam	Exam
17-20	8	Understanding mechanical	Types of Stress and Strain - Young's	Blackboard, Display	Daily oral and

		properties of materials	Modulus - Mechanical Properties and Temperature	Screen	written exams
21-24	8	Understanding magnetic and electrical properties of materials	Magnetic Properties of Materials - Electrical Conductivity - Insulators and Semiconductors - Electrical Resistance - Hall Effect - Piezoelectricity - Ferroelectricity - Superconducting Materials	Blackboard, Display Screen	Daily oral and written exams
25-26	4	Understanding the fourth state of matter: plasma	Differences Between States of Matter - Plasma Forms - Importance of Plasma Studies	Blackboard, Display Screen	Daily oral and written exams
27-29	6	Understanding composite and reinforced materials	Natural Composites - Composite Fabrication - Types of Composites - Advantages and Disadvantages	Blackboard, Display Screen	Daily oral and written exams
30	2	Final Exam	On-Site Examination	Exam	Exam

23.Course Evaluation

Grades are distributed out of 100 based on tasks assigned to students such as daily preparation, oral and written quizzes, discussions, report evaluations, and seminars

24.Learning and Teaching Resources

• **Heat and Properties of Materials by Kadem Ahmed Mohamed** • **The Science and Engineering of Materials by Donald R. Askeland, Pradeep P. Phulé** • **Classification of Materials by Josep Poch March** • **Thermodynamics by Dr. Sami Mazloum et al.**	**Required Textbooks (If Available)**

Heat and Thermodynamics by Mark W. Zymansky	Main references (sources)
Heat and Properties of Materials Lecture Notes (PDF) - Physics.com (Largest Physics Library)	Recommended supporting books and references (scientific journals, reports....
1. Heat and Properties of Matter - Al-Fareed Physics Website 2. Properties of Matter and Heat - Al-Noor Library Website	electronic references, Internet sites

Course Description Form

25.Course Name:
Optics
26.Course Code:
210 PHOP
27.Semester / Year:
2024-2025
28.Description Preparation Date:
07/11/2024
29.Available Attendance Forms:
Daily Attendance
30.Number of Credit Hours (60) / Number of Units (4)
2 Theoretical Hours
31.Course administrator's name (mention all, if more than one name)
Assist. Prof. Ahmed Qasim Ubaid

aubaid@uowasit.edu.iq
32.Course Objectives

Course Objectives	• Students learn about the basics of light and optics, their importance in our lives, and the integration of physical meanings Mathematical laws and derivations and opening the student's horizons towards scientific theories and their applications. • Make the student able to know the basics of physics. • Make the student able to understand physical phenomena from a mathematical point of view. • Enable the student to obtain knowledge and understanding of the scientific laws of physics and practical applications of physical sciences logical and scientific analysis and explanation of physical phenomena • Teaching the student thinking skills and enabling him to understand and solve scientific problems related to the laws of physics use of laboratory equipment in the electrical laboratory.

33. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in presenting this unit is to encourage student participation in the exercises, and at the same time itself refine and expand their critical thinking skills. This will be

	achieved through classes and educational programmers interactive and by looking at the type of simple experiments that include some sampling activities that are of interest to students.

34. Course Structure

Week	Hours	Learning Outcomes	Unit / Topic Name	Learning Method	Assessment Method
1-4	12	Knowledge of the concepts Basic Optics.	Introduction to Light Introduction to the concept of light Reflection and its laws Applications of reflection Refraction and its laws of refraction	Blackboard, Display Screen, E-learning	Daily oral and written exams
5-8	12	Knowing the nature of light	Light Characteristics of electromagnetic radiation - Theories and explanations of light - Fermat's principle - Class Questions	Blackboard, Display Screen	Daily oral and written exams
9-12	12	Transmission of light between primary media in total reflection Internal	The phenomenon of light travelling between different media, realising the Laws of refraction and critical angle	Blackboard, Display Screen	Daily oral and written exams
13-15	9	Knowing Dealing with applications	Laws in Matters Chapter Two	Blackboard, Display Screen	Daily oral and written exams
16	3	Midterm Exam	On-Site Examination	Exam	Exam
17-20	12	Mirrors The process by which mirror images are formed	Plane mirrors Reflection in plane mirrors Applications of Plane Mirror	Blackboard, Display Screen	Daily oral and written exams

21-24	12	Mirror images are formed by reflection	Spherical mirrors Convex mirrors _Images are formed in them _Law of distance of image and object	Blackboard, Display Screen	Daily oral and written exams
25-26	6	The formation of convex mirror phantoms -	Mechanism of formation Illusory image in mirrors Calculating the distance of the image and object Magnification and image qualities	Blackboard, Display Screen	Daily oral and written exams
27-29	9	Formation of images on surfaces Surfaces and formation of images _ Lenses and Images Lenses -	The formation of images on spherical surfaces _The mechanism by which images are formed on these surfaces with equations Types of Lenses Compound lenses The concept of focal length Gaussian relationship to find the focal length	Blackboard, Display Screen	Daily oral and written exams
30	3	Acquire Lens manufacturers' formulas Knowledge of the concept of aberration	Knowledge in the concepts Basic concepts of lenses and their applications Use of lenses The concept of spherical aberration Types of spherical aberration Methods of eliminating aberration	Blackboard, Display Screen	Daily oral and written exams

35. Course Evaluation	
Grades are distributed out of 100 based on tasks assigned to students such as daily preparation, oral and written quizzes, discussions, report evaluations, and seminars	
36. Learning and Teaching Resources	
• **Paper lectures written by course instructors** **Fundamentals of Optics Francis A. Geiker Harvey A. White** •	**Required Textbooks (If Available)**
كتاب المقرر. Fundamental of optics Francis A, Jenkin Harveye, whitte	Main references (sources)
	Recommended supporting books and references (scientific journals, reports....
The online classroom and its published resources and tests	electronic references, Internet sites

Course Description Form

1. Course Name:
Astronomy
2. Course Code: PHS218
3. Semester / Year:0202- 0202
4. Description Preparation Date:
2025-2024
5. Available Attendance Forms:
My attendance is mandatory
6. Number of Credit Hours (Total) / Number of Units (2)
60 hours 0 hours
7. Course administrator's name (mention all, if more than one name)
Ms.c lecturer Imad Kamil Zayer ealrobeiy@uowasit.edu.iq

8. Course Objectives	
Objectives of the study subject	**Cognitive dimension:** **Establishing a Solid Foundation in Astronomy:** Introducing students to the fundamentals of astronomy, starting with basic concepts and progressing to complex astronomical phenomena. Students learn about various celestial objects (stars, planets, galaxies), their properties, movements, and evolution. This knowledge is essential for understanding the universe around us and interpreting the natural phenomena we observe in the sky. **Developing Analytical and Scientific Thinking Skills:** Astronomy relies on observation and experimentation, requiring analytical skills and scientific thinking. Students learn how to analyze astronomical data, draw conclusions, and build scientific models. These skills are essential for any physicist seeking to understand the universe.

	Connecting Physics with Astronomy: Physics is the theoretical foundation of astronomy. The text explains how the laws of physics are used to explain astronomical phenomena, such as the movement of planets, the radiation of stars, and the formation of galaxies. This connection enables students to gain a deeper understanding of both sciences and apply physics to real astronomical problems. **Understanding the History and Evolution of Astronomy:** The course aims to clarify the history of astronomy, with a focus on the contributions of different civilizations, especially the Islamic civilization. Students learn how astronomy has evolved over time and how scientists have contributed to our understanding of the universe. This historical understanding enhances awareness of the importance of science and encourages students to contribute to its development. Absolutely! Here is the translation of the provided text into English: **Understanding Astronomical Techniques and Tools:** The book explains the tools and techniques used in astronomy, such as telescopes and astronomical observatories. Students learn how these tools work and how they are used to collect astronomical data. This familiarity with modern technologies enables students to participate in future astronomical research. **Expanding Students' Horizons:** Astronomy opens up wide horizons for students, encouraging them to think about the universe and our place in it. The book raises questions about the origin of the universe, its fate, and the possibility of life beyond Earth. These questions motivate students to research and explore, expanding their scientific horizons. Overall, the teaching of astronomy to physics students aims to provide them with comprehensive knowledge of astronomy, develop their scientific skills, and connect physics with this exciting science. This course enables students to understand the universe around them and contribute to future astronomical research.

9. Teaching and Learning Strategies

Strategy	Style of thinking and discussion E-learning (explanatory videos and electronic tests)
	Practical tests

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
0+1	0	Knowledge	Introduction to Astronomy and Ancient Civilizations (lectures) Lecture 1: Definition astronomy and importance, the origins astronomy and development through history, its relationship w other sciences.)	Use the whiteboard and display screen And e-learning	The exam The daily Oral
2+3	0	Knowledge	Lecture 2: Astronomy in ancient civilizations (Egyptian, Babylonian, Greek). Contributions of Isla civilization to astronomy.	Use the whiteboard and display screen And e-learning	The exam The daily Oral
2	0	Knowledge	The celestial sphere a Kepler's laws of motion.	Classrooms	The exam Editorial The first month
7+6	0	Knowledge	Unit Two: The Sun and the Moon Physical properties of the S (composition temperatu radiation).	whiteboard and display screen And e-learning	The exam The daily Oral

9+8	0	Knowledge	Solar activity (sunspots, so flares, solar wind).	whiteboard and display screen	The exam The daily Oral
				And e-learning	
10	0	Knowledge	Exam - First Semester	**Classrooms**	Monthly Exam (Second Month)
11+12	0	Knowledge	Physical properties of moon (composition, surfaCraters).	Blackboard, Projector, E-learning	Daily Oral Exam
13+14	0	Knowledge	Unit 3: The Solar System a the Planets. Overview of Solar System, the in planets (Mercury, Ven Earth, Mars	Blackboard, Projector, E-learning	Daily Oral Exam
15+16	0	Knowledge	Properties of the plan Mercury and Venus.	Blackboard, Projector, E-learning	Daily Oral Exam
17+18	0	Knowledge	Planet Earth (composition, atmosphere, climate).	Blackboard, Projector, E-learning	Daily Oral Exam
19	0	Knowledge	Exam - Second Semester	Classrooms	Monthly Exam (First Month)
20+21	0	Knowledge	Properties of the planet Ma	Blackboard, Projector, E-learning	Daily Oral Exam
22+23	0	Knowledge	Outer planets (Jupiter, Saturn, Uranus, Neptune). Characteristics of outer planets and their moons.	Blackboard, Projector, E-learning	Daily Oral Exam
24+25	0	Knowledge	Outer planets (Jupiter, Satu Uranus, Neptune).	Blackboard, Projector, E-learning	Daily Oral Exam

26+27	0	Knowledge	Unit Four: Stars Physical properties of stars (composition, temperature, luminosity).		Daily Oral Exam
28	0	Knowledge	Exam - Second Semester	Monthly Exam (Second Month)	

11.Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc	
12.Learning and Teaching Resources	
Astronomy book, written by Dr. Hamid Majul Al-Naimi https://x.com/i/flow/login?redirect_after_login=%2Farabic_na sa	Required prescribed books (Methodology, if any)

Course Description Form

37. Course Name:	38.
Electricity II	
39. Course Code:	40.
BHEM102	
41. Semester / Year:	42.
2024-2025	
43. Description Preparation Date:	44.
07/11/2024	
45. Available Attendance Forms:	46.
Daily Attendance	
47. Number of Credit Hours (60) / Number of Units (4)	48.
2 Theoretical Hours	
49. Course administrator's name (mention all, if more than one name)	50.
Assist. Prof. Dr. Najlaa Jerjack Abdullah njerjack@uowasit.edu.iq	
51. Course Objectives	**52.**

Course Objectives	• Students learn about the basics of electricity and magnetism, their importance in our lives, and the integration of physical meanings Mathematical laws and derivations and opening the student's horizons towards scientific theories and their applications. • Make the student able to know the basics of physics. • Make the student able to understand physical phenomena from a mathematical point of view. • Enable the student to obtain knowledge and understanding of the scientific laws of physics and practical applications of physical sciences logical and scientific analysis and explanation of physical phenomena • Teaching the student thinking skills and enabling him to understand and solve scientific problems related to the laws of physics use of laboratory equipment in the electrical laboratory.	•
53. Teaching and Learning Strategies		**54.**
Strategy	The main strategy that will be adopted in presenting this unit is to	

	encourage student participation in the exercises, and at the same time itself refine and expand their critical thinking skills. This will be achieved through classes and educational programmers interactive and by looking at the type of simple experiments that include some sampling activities that are of interest to students.	

55. Course Structure

56.

Week	Hours	Learning Outcomes	Unit / Topic Name	Learning Method	Assessment Method	
1-4	8	Understanding and teaching the student the basics of electrical physics and mathematics related to electrical physics, teaching him electrical circuits and everything related to them.	Magnetic field of electric current - Biot-Savert Law And its applications - Ampere's law and its uses	Blackboard, Display Screen, E-learning	Daily oral and written exams	
5-8	8	Empowering students to get knowledge and understanding in action modern electrical circuits.	Some electrical appliances - The force on a current conductor There is an electric current through it Exists in a magnetic field	Blackboard, Display Screen	Daily oral and written exams	

			- Coupling torque on a coil through which an electric current passes in a magnetic field			
9-12	8	Enabling students to obtain knowledge and understanding of the design of various electrical circuits	- Moving coil galvanometer - Current meter - Potentiometer - Ejection galvanometer	Blackboard, Display Screen	Daily oral and written exams	
13-15	6	Electrical by specialists in the subject matter with emphasis on using mathematics as a basis to understand and learn.	Induced electromotive force - Kinetic induced electromotive force - Faraday's law - Lenz's law - Measure magnetic induction using a search coil - Faraday disk - Induced electric field	Blackboard, Display Screen	Daily oral and written exams	
16	2	Midterm Exam	On-Site Examination	Exam	Exam	
17-20	8	Giving them practical skills in solving problems related to electrical circuits.	Inductance - Mutual induction - Self-induction - Energy stored in the magnetic field - Energy density Magnetism - Connecting inductors - Electrical transformer - Eddy currents	Blackboard, Display Screen	Daily oral and written exams	

21-24	8	Emphasis is placed on topics of fundamentals of electricity and analysis of electrical circuits using control systems for programming.	Alternating electric current - Basic alternating current - Instantaneous current - Elements of impedance - The instantaneous value of capacity - Effective value of current - Trend chart for potential differences	Blackboard, Display Screen	Daily oral and written exams	
25-26	4	Acquiring knowledge in the field of inductors and capacitors circuits	Inductor circuits And the expansive T - Change in electrical current In the circuit (resistance - inductance) - Transformed and power transfer - Rectifiers and filters Studies	Blackboard, Display Screen	Daily oral and written exams	
27-29	6	Acquiring knowledge in the field of electromagnetic radiation	Introduction to electromagnetic waves - Maxwell's equations - Plane electromagnetic waves - Portable energy	Blackboard, Display Screen	Daily oral and written exams	

			mediated Electromagnetic waves - Momentum and radiation pressure - Wave production Electromagnetism - Electromagnetic spectrum			
30	2	Final Exam	On-Site Examination	Exam	Exam	

57. Course Evaluation	**58.**
Grades are distributed out of 100 based on tasks assigned to students such as daily preparation, oral and written quizzes, discussions, report evaluations, and seminars	
59. Learning and Teaching Resources	60.

• أساسيات الكهربائية والمغناطيسية , تأليف : يحيى عبد الحميد الحاج علي • مدخل إلى الكهربائية والمغناطيسية, تأليف د.منى عبد الكريم الخشا ب، د.كاظم احمد محمد • أساسيات النظرية الكهرومغناطيسية , ترجم ة: يحيى عبد الحميد الحاج علي ، رحمن رستم.	**Required Textbooks (If Available)**	
Electricity by Sears Electrical magnetism (Halliday and Resnick) University physics (Young freedman).	Main references (sources)	
	Recommended supporting books and references (scientific journals, reports....	

Al-Fareed Physics Website	electronic references, Internet sites	

Course Description Form

61.	Course Name:
Mathematics II	
62.	Course Code:
63.	Semester / Year:2024- 2025
64.	Description Preparation Date:
2025/2/1	
65.	Available Attendance Forms:
In Person	
66.	Number of Credit Hours (Total) / Number of Units (6)

90 hours 3 hours	
67. Course administrator's name (mention all, if more than one name)	
PHD. lecturer Haider Jameel Hassan email :hjameel@uowasit.edu.iq	
68. Course Objectives	
Course Objectives	This course aims to provide students with advanced mathematical foundations that enable them to analyze mathematical and applied problems in various engineering and scientific fields. This includes: 1. **Developing a Deep Understanding of Fundamental Mathematical Concepts** o Understanding the nature of infinite series and convergence tests. o Learning power series and their use in function representation. o Understanding vector operations and handling different coordinate systems. 2. **Acquiring Analytical and Problem-Solving Skills** o Solving first and second-order differential equations using analytical and practical methods. o Applying directional analysis and partial

	differentiation to solve mathematical and physical problems. o Using derivatives and integrals to analyze multi-variable functions. 3. **Enhancing Application Skills in Mathematics and Engineering** o Applying mathematics to analyze physical and engineering phenomena such as dynamics, thermodynamics, and electromagnetism. o Understanding and using vector calculus in practical fields. o Solving real-world problems using differential equations and numerical analysis techniques.

69. Teaching and Learning Strategies

Strategy	To achieve the course objectives and provide an effective learning experience, a variety of teaching strategies will be used to enhance understanding and practical application of mathematical concepts. The key strategies include: **Active Learning** • Encouraging students' active participation through: o Classroom discussions to solve mathematical problems and analyze results. o Group work on exercises and mathematical challenges. o Critical analysis of mathematical concepts and linking them to

practical applications.

Problem-Based Learning (PBL)

- Presenting real-world mathematical challenges that require the application of acquired skills, such as:
  - Solving physical and engineering problems using calculus.
  - Analyzing mathematical modeling data in different fields.
  - Applying differential equations to problems in dynamics, thermodynamics, and electricity.

Use of Technology and Digital Tools

- Integrating digital tools into the course for better understanding and practical application:
  - Using software like MATLAB and Python to solve differential equations, plot vectors, and analyze series.
  - Utilizing digital simulations and interactive applications to understand function behaviors and infinite series.
  - Reviewing recorded lessons and online lectures to enhance self-learning

70. Course Structure

Week	Hours	Learning Outcomes	Unit/Topic	Teaching Method	Assessment Method
1	3	Understanding the nature of sequences and series	Infinite Sequences and Series	In-person	General questions, discussion, and

					problem-solving
2	3	Performing convergence tests for series	Infinite Series and Convergence Tests	In-person	General questions, discussion, and problem-solving
3	3	Analyzing geometric series	Geometric Series	In-person	General questions, discussion, or quiz
4	3	Expanding functions using power series	Power Series and Function Expansion	In-person	General questions, discussion, and problem-solving
5	3	Applying Taylor and Maclaurin series	Taylor and Maclaurin Series	In-person	Oral exam
6	3	Computing logarithms using series expansion	Logarithm Computation with Power Series	In-person	General questions and problem-solving
7	3	Applying series to trigonometric functions	Computation of Trigonometric Functions	In-person	Problem-solving
8	3	Using series in engineering applications	Practical Applications of Power Series	In-person	Monthly test covering previous topics
9	3	Representing and operating vectors	Vectors and Vector Operations	In-person	Oral exam
10	3	Using coordinate systems to solve problems	Space Coordinates	In-person	Oral exam

11	3	Computing dot and cross products	Dot and Cross Products	In-person	Solving related problems
12	3	Representing lines and planes	Equations of Lines and Planes	In-person	Continuing problem-solving
13	3	Applying partial differentiation in function analysis	Partial Differentiation and Directional Derivatives	In-person	Solving related problems
14	3	Computing directional derivatives and gradients	Directional Derivative and Gradient Vector	In-person	Solving related problems
15	3	Analyzing divergence and curl	Divergence and Curl in Mathematics	In-person	Solving related problems
16	3	Applying the chain rule in differentiation	Chain Rule and Total Differentiation	In-person	Continuing topic and solving problems
17	3	Solving first-order differential equations	First-Order Differential Equations	In-person	Monthly test covering all previous topics
18	3	Analyzing linear and nonlinear equations	Linear and Nonlinear Differential Equations	In-person	Solving related problems
19	3	Handling homogeneous and non-homogeneous equations	Homogeneous and Non-Homogeneous Equations	In-person	Solving related problems
20	3	Analyzing second-order differential equations	Second-Order Differential Equations	In-person	Solving related problems
21	3	Applying methods for solving partial differential equations	Methods for Solving Partial Differential Equations	In-person	Monthly test covering all previous topics
22	3	Using differential	Applications of	In-person	Explanation

		equations in engineering and science	Differential Equations		and problem-solving
23	3	Review and practical assessments	Final Review and Progress Evaluation	In-person	Explanation and problem-solving
24	3	Conducting final exam and comprehensive evaluation	Final Exam and Course Evaluation	In-person	Explanation and problem-solving

71. Course Evaluation

Student assessment is based on participation, attendance, monthly exams, reports, and practical applications.

72. Learning and Teaching Resources

1. **Calculus and Analytic Geometry** - George B. Thomas, 7th Edition, 2005. 2. **A First Course in Differential Equations with Modeling Applications** - Dennis G. Zill, 8th Edition, 2005. 3. **Differential Equations with Boundary Value Problems** - John Polking, Albert Boggess, David Arnold, 2nd Edition, 2006. 4. **Schaum's Outline of Advanced Calculus** - Robert Wrede, Murray R. Spiegel, 2nd Edition, 2002.	Required prescribed books (Methodology, if any)
1. **Calculus and Analytic Geometry** - George B. Thomas, 7th Edition, 2005.	Main references (sources)

2. **A First Course in Differential Equations with Modeling Applications** - Dennis G. Zill, 8th Edition, 2005. 3. **Differential Equations with Boundary Value Problems** - John Polking, Albert Boggess, David Arnold, 2nd Edition, 2006. 4. **Schaum's Outline of Advanced Calculus** - Robert Wrede, Murray R. Spiegel, 2nd Edition, 2002. 5. **Mathematical Physics** - Ma'an Abdul-Majid Ibrahim, 1st Edition, 2000. 6. **Partial Differential Equations for Scientists and Engineers** - S. J. Farlow, Translated by Dr. Ataallah Thamer Al-Ani, University of Baghdad - Bayt Al-Hikma.	
1. **Calculus and Analytic Geometry** - George B. Thomas, 7th Edition, 2005. 2. **A First Course in Differential Equations with Modeling Applications** - Dennis G. Zill, 8th Edition, 2005. 3. **Differential Equations with Boundary Value Problems** - John Polking, Albert Boggess, David Arnold, 2nd Edition, 2006. 4. **Schaum's Outline of Advanced Calculus** - Robert Wrede, Murray R. Spiegel, 2nd Edition, 2002.	Recommended supporting books and references (scientific journals, reports....
1. **MIT OpenCourseWare - Mathematics:** https://ocw.mit.edu/courses/mathematics/ 2. **Khan Academy - Mathematics:** https://www.khanacademy.org/math 3. **Paul's Online Math Notes:** https://tutorial.math.lamar.edu/	electronic references, Internet sites

Course Description Form

73. Course Name:
Sound and wave motion
74. Course Code: PHS218
75. Semester / Year:2024- 2025
76. Description Preparation Date:
2025/1/29
77. Available Attendance Forms:
My attendance is mandatory
78. Number of Credit Hours (Total) / Number of Units (4)
60 hours 2 hours
79. Course administrator's name (mention all, if more than one name)
PHD. lecturer ALI ABED JABER email :alia624@uowasit.edu.iq

80. Course Objectives	
Objectives of the study subject	**Cognitive dimension:** 1. Understanding the nature of waves and their types (mechanical and electromagnetic). 2. Identify the characteristics of waves (frequency, wavelength, amplitude, speed). 3. Study the phenomena of reflection, refraction, interference and diffraction. 4. Understand the nature of sound as a mechanical wave and distinguish between its characteristics (sound intensity, frequency, wavelength). 5. Identify how sound is transmitted and the effect of the environment on its speed. **Skill objectives:** 1. Analyze data and experiments related to wave transmission. 2. Applying mathematical laws to calculate the properties of sound and waves. 3. Carrying out practical experiments to understand phenomena such as interference, reflection, and diffraction. 4. Use devices to measure sound characteristics, such as a frequency and sound intensity measuring device. **Emotional goals:** 1. Enhance the student's appreciation of the importance of sound and waves in our daily lives. 2. Promote awareness of the importance of wave-based technologies (such as radar and ultrasound).

	3. Developing scientific and investigative thinking.

81. Teaching and Learning Strategies

Strategy	Style of thinking and discussion E-learning (explanatory videos and electronic tests) Practical tests

82. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
2+1	2	Knowledge	Chapter One (definition of sound, psychological meaning of sound, Condition for sound occurrence and propagation)	Use the whiteboard and display screen And e-learning	The exam The daily Oral
4+3	2	Knowledge	Chapter Two (vibrating movement, simple harmonic motion, Our applications on moveme simple harmonic)	Use the whiteboard and display screen And e-learning	The exam The daily Oral
5	2	Knowledge	First semester exam	Classrooms	The exam Editorial

					The first month
7+6	2	Knowledge	Chapter Three: Composition simple harmonic movements Composition rul composition of two simple harmonic motions in the same direction, Lissajous figure s, composition of two perpendicular simple harmonic motions with the same frequency	whiteboard and display screen And e-learning	The exam The daily Oral
9+8	2	Knowledge	Chapter Three: The graphical method for composing two perpendicular simple harmonic motions, composing two perpendicular simple harmonic motions with a frequency ratio of 1:2, strikes.	whiteboard and display screen And e-learning	The exam The daily Oral
10	2	Knowledge	Exam - First Semester	**Classrooms**	Monthly Exam (Second Mont

11+12	2	Knowledge	Chapter4-Damped Vibration • Introduction • Damping Force • Equation of Damped Harmonic Motion •Solution of the Damped Harmonic Motion Equation	Blackboard, Projector, E-learning	Daily Oral Exam
13+14	2	Knowledge	**Chapter 4** • Solution of the Damped Harmonic Motion Equation (Cases: No Damping, Underdamping, Critical Damping, Overdamping) •Damping Measures (LogarithmicDecrement, Relaxation Time, Quality Factor Equation)	Blackboard, Projector, E-learning	Daily Oral Exam
15+16	2	Knowledge	Chapter 5 - Forced Vibration • Introduction • Equation of Motion for a Damped Oscillator under a Periodic External Force • Solution of the Forced Motion Equation	Blackboard, Projector, E-learning	Daily Oral Exam
17+18	2	Knowledge	Chapter 5 • Resonance	Blackboard, Projector, E-learning	Daily Oral Exam

			• Amplitude of Vibration at Resonance • Relationship Between Resonance Frequency and Natural Frequencies of the Oscillator • Phase Angle, Forced Frequency, and Resonance		
19	2	Knowledge	Exam - Second Semester	Classrooms	Monthly Exam (First Month)
20+21	2	Knowledge	Chapter 6 - Transverse Waves in One Dimension • Introduction • Oscillatory Motion and Wave Motion • Transverse Wave Motion in One Dimension • Wave Motion Equation in a Vibrating String • Energy of a Transverse Wave	Blackboard, Projector, E-learning	Daily Oral Exam
22+23	2	Knowledge	Chapter 6 • Wave Reflection (Fixed End, Free End, Moving End of a Stretched String) • Standing Waves • Free Vibration of a Stretched,	Blackboard, Projector, E-learning	Daily Oral Exam

			Finite-Length String • Sonometer • Laws of Vibrating Strings		
24+25	2	Knowledge	Chapter7-Longitudinal Waves (Sound Waves) • Introduction • Longitudinal Waves in a Metal Rod • Longitudinal Waves in a Fluid Column • Sound Wave Equation in Terms of Pressure • Speed of Sound Waves in a Gas	Blackboard, Projector, E-learning	Daily Oral Exam
26+27	2	Knowledge	Chapter 7 • Laplace Correction • Sound Intensity • Standing Longitudinal Waves in Resonance Tubes (Both Ends Closed, Both Ends Open, One End Open & One End Closed)		Daily Oral Exa
28	2	Knowledge	Exam - Second Semester	Monthly Exam (Second Month)	

83. Course Evaluation

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

84. Learning and Teaching Resources	
1 - Classical Mechanics for Physics Graduate Students, ERNESTO CORINALDESI, 1998. 2 - Classical Mechanics, R. DOUGLAS and GOREGE, 2006.	Required prescribed books (Methodology, if any)
1 - Physics for Scientists and Engineers with modern Physics, SERWAY and JEWETT, 9 Edition, 2014. 2- University Physics by Francis W. Sears, Mark W. Zemanseky and Hugh D. Young, 1982. 3- Introduction to Physics by Jojn D.Cutnell, Kenneth W.Johnson 8th Ed.,2010	Main references (sources)
1- Classical Mechanics by Herbert Goldstein, 2002. 2- Classical Mechanics by Michael Cohen, 2014. 3- Classical Mechanics by Mahmoud Hamza Dahi, 2020.	Recommended supporting books and references (scientific journals, reports....

Course Description Form

85.Course Name:
Biology/ theoretical part
86.Course Code:
215 PHC2

87.Semester / Year:
2024/ 2025
88.Description Preparation Date:
7/11/2024
89.Available Attendance Forms:
Daily attendance
90.Number of Credit Hours (Total) / Number of Units (Total) :
30 hours Number of units (2 units)
91.Course administrator's name (mention all, if more than one name)
Name: Lecturer . zamen abood ramadhan Email: z.ramadaan@uowasit.edu.iq
92.Course Objectives

Course Objectives	1- Distance from industry: (a) Provides the artist with commercial ideas, data and basic topics of this subject in terms of its emergence and its role in contributing to the development of technology. (b) That the student comprehends the concepts contained in this subject and is able to apply them practically. 2- Emotional methods: (a) Helping the student develop his abilities and

	inclinations to understand the topics of this subject. (b) Developing the student's attitudes and interests towards understanding the basic concepts of this subject and employing them in the field of education (teaching). 3- Psychomotor methods (skills): (a) Developing the student's ability to master the skill of fact-finding and the basics and principles of this subject to practical administrative practices that can be observed. (b): Training the student on the basic skills that enable him to invest and employ the concepts and principles of this subject in the field of work after graduation.

93. Teaching and Learning Strategies

Strategy	-Thinking and Discussion Method - E-learning (Explanatory Videos and Electronic Tests) - Practical Tests

94. Course Structure

Week	Hours	RequiredLearning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	Knowledge	**Microsoft word** Introduction of micro soft word	Using whiteboard and data show and E-learning	Exams and quick exams and assignments

2	1	Knowledge	Menu bar File menu	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
3	1	Knowledge	**Home menu**	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
4	1	Knowledge	**Page setup menu** **References menu**	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
5	1	Knowledge	**View menu** **Review menu**	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
6	1	Knowledge	Power point File menu	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
7			**exam**		
8	1	Knowledge	Home menu Insert menu	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
9	1	Knowledge	Design menu Transition menu	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
10	1	Knowledge	Animation menu	Using whiteboard and data show	Exams and quick exams and

			Review menu	and E-learning	assignments
11	1	Knowledge	Slide show	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
12	1	Knowledge	**Microsoft excel**	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
13	1	Knowledge	**Introduction of Microsoft excel**	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
14	1	Knowledge	**home menu** **file menu**	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
15	1	Knowledge	**Insert menu** View menu	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
16	1	Knowledge	**Review menu**	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
17	1	Knowledge	Create equation of Microsoft	Using whiteboard and data show	Exams and quick exams and

			excel	and E-learning	assignments
18	1	Knowledge	Create conditional formatting	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
19	1	Knowledge	**network** **types of networks**	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
20	1	Knowledge	**Internet** Connection with internet	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
21	1	Knowledge	Service of internet Start page	Using whiteboard and data show and E-learning	Exams and quick exams and assignments
22	1	Knowledge	**Email** Properties of email Create of gmail	Using whiteboard and data show and E-learning	Exams and quick exams and assignments

95.Course Evaluation	
The grade is distributed out of 100 according to the tasks assigned to the student, such as daily preparation, daily and monthly oral exams. And editing, discussing and evaluating reports and seminars , etc.	
96.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Basics of computer
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
English language	
2. Course Code	
2C2El 106	

3. Semester / Year:
2024/2025
4. Description Preparation Date:
7/11/2024
5. Available Attendance Forms:
Actual mandatory attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 theoretical hours
7. Course administrator's name (mention all, if more than one name)
Name: Assistant Lecturer Nagham Fadhil Hussein Email: nahussain@uowasit.edu.iq

8. Course Objectives	
Course Objectives	**1- To enrich the students' knowledge about English language** **2- Improve students' ability in listening, speaking, reading and writing** **3- Mak the students feel with the English language in their study**
9. Teaching and Learning Strategies	

Strategy	Discussion and ask questions, giving the chance to students to participate by speaking, reading and translation.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-8	8	Tenses, Questions, using bilingual dictionary, part of speech, words with more one meaning Present simple, present continuous, using have got &has got describing countries Past simple, past continuous, irregular verb, making connections, suffixes to make different words& negatives Review	Unit 1: Getting to know Unit 2: The way we live Unit3: It all went wrong Exercises and solutions	Theoretical lectures ,	Examinations and daily activity
9-16	8	Quantity (much, many), some and any (someone, anyone, somewhere, anywhere…), learning buying things Review Verb patterns1, future intentions, hot verbs (have, go and come) What's like, comparative & superlative adjectives, talking about cities, synonyms and antonyms Present perfect and past simple ,for and since tense revision, past participle, adverbs and words pairs.	Unit4: Lets go shopping Exercises and solutions Unit 5: What do you want to do Unit 6: Tell me what's like Exercises and solutions Unit 7: Fame	Theoretical lectures	Examinations and daily activity

17-22	6	Review Obligation (have(got), should& must) jobs, words that go together and compound nouns Time and conditional clauses, hot verbs (take, get, do and make) Verb patterns2 infinitive purpose , describing feelings and situations	Exercises and solutions Unit 8: Do's and don't Unit 9: Going places Unit 10: Scared to death	Theoretical lectures	Examinations and daily activity
23-27	5	Review Passive, verbs and participles, verbs and nouns go together second conditional, might, phrasal verbs	Exercises and solutions Unit 11: Thing that changed the world Unit:12 Dreams and reality	Theoretical lecture	Examinations and daily activity

28-30	3	present perfect and present perfect continuous, word formation and adverbs past perfect, reported statement, hot verbs (bring, take, go and come)	Unit13: Earning a living Unit 14: Family ties	Theoretical lecture	Examinations and daily activity

11. Course Evaluation

- The 40th annual session is divided into
- 30 marks for the semester exams (at last two test in each semester0
-10 marks for participation, activities and homework

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	New Headway Pulse for Pre-Intermediate, John and Liz Soars, Oxford
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course name -1
Crimes of the Baath regime in Iraq
Course code -2
Chapter/Year -3
2024_2025
Date of preparation of this description -4
2024/11/7
Available attendance forms -5
Daily attendance
(Number of study hours (30) / Number of units (1 -6
1One hour theory
Course Instructor Name -7
M.M. Lara Mahmoud Jabbar / **ljabbar@uowasit.edu.iq: Email**
Course objectives -8

This course aims to introduce students to the heinous crimes committed by the Baath regime in Iraq, and to track, document, analyze and study them to reveal the truth about the tragedies, calamities and disasters that occurred in our country as a result of the unjust Baath regime, which included all aspects of social life.

Teaching and learning strategies -9

-10

1- **Identifying the crimes of the Baath regime in Iraq**
2- **Analyzing and documenting an important era in modern Iraqi history that was characterized by darkness**
3- **Reviewing the crimes of mass graves**
4- **Clarifying the effects of the crimes of draining the marshes and adopting the scorched earth policy and its impact on Iraqi society**

Course structure -11

Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	Watches	The week
General			We explain the	**1**	**1**

questions and scientific discussion	My theoretical presence	Introduction to the subject	most important vocabulary of the subject matter.		
General questions and scientific discussion	My theoretical presence	Iraqi High Criminal Court Law of 2005 against the Baath regime	We introduce the student to the most important laws of the new Iraqi constitution.	**1**	**2**
General questions and scientific discussion	My theoretical presence	The concept of Baath crimes and their types	Detailed definition of crime types	**1**	**3**
viva voce	My theoretical	Definition of crime	Teaching students the definitions and concept of	**1**	**4**

	presence		crime.		
General questions and scientific discussion	My theoretical presence	Crime Sections	Detailed explanation of all crime sections	**1**	**5**
Clarification of what was mentioned in the previous lecture	My theoretical presence	International crimes	Explaining in detail what was mentioned about the party's international crimes	**1**	**6**
Monthly exam	MY theoretical presence	exam	a test	**1**	**7**

General questions and scientific discussion	My theoretical presence	Psychological crimes of the Baath regime and their effects Mechanisms of psychological crimes Effects of psychological crimes	The effects of psychological crimes on individuals	**1**	**8**
General questions and scientific discussion	My theoretical presence	Social crimes of the Baath regime and their effects Militarization of society	Highlighting the brutal methods used by students in society	**1**	**9**
Daily activity + report	My theoretical presence	The economic crimes of the Baath regime and their effects	Explaining the role of economic crimes and their negative effects on the individual economy	**1**	**10**
General questions and scientific discussion	My theoretical	International crimes of the Baath regime and their effects	The impact of international crimes on the	**1**	**11**

	presence		people		
Scientific and general questions about the subject matter	My theoretical presence	The most prominent violations of the Baath regime in Iraq	Providing a detailed explanation of the most prominent violations of the party against the Iraqi people	**1**	**12**
General questions and scientific discussion	My theoretical presence	The Baath regime's position on religion	Explaining the party's vision of the true religion	**1**	**13**
Analysis and discussion	My theoretical presence	Violations of Iraqi laws	Highlighting the party's role in violating the status quo laws and making them mere ink on paper	**1**	**14**

exam	My theoretical presence	First semester exam	a test	**1**	**15**
		Spring break	vacation		
General questions and scientific discussion	My theoretical presence	Human rights violations	A detailed explanation of the most brutal violations that the Iraqi people were subjected to, ignoring human rights.	**1**	**1**
General questions and scientific discussion	My theoretical presence	Political violations of the Baath regime	Delving into the political violations committed by the party with individuals	**1**	**2**

General questions and scientific discussion	My theoretical presence	Military violations of the Baath regime	Delving into the military violations committed by the party against individuals	**1**	**3**
General questions and scientific discussion	My theoretical presence	The most prominent torture prisons of the Baath regime	A pictorial explanation of the violations in Iraqi prisons during the rule of the tyrant and their shameful actions towards the prisoners	**1**	**4**
General questions and scientific discussion	My theoretical presence	Environmental crimes in Iraq	We should not forget the negative effects of the party on the environment and the methods used in this regard.	**1**	**5**

General questions and scientific discussion	My theoretical presence	War and radioactive pollution	A detailed explanation of the prohibited weapons of war with radiation that is destructive to the environment and humans.	**1**	**6**
Monthly exam in all previous subjects	My theoretical presence	Evaluation Second semester exam	a test	**1**	**7**
General questions and scientific discussion	My theoretical presence	A detailed explanation of the reasons for drying up the marshes and the negative effects resulting from drying up	The methods of repression used by the party to remove and destroy cities and villages opposing its authority	**1**	**8**

General questions and scientific discussion Oral exam	My theoretical presence	Drying up the Iraqi marshes	A detailed explanation of the reasons for drying up the marshes and the negative effects resulting from drying up	**1**	**9**
General questions and scientific discussion	My theoretical presence	Cutting trees, removing orchards and bulldozing farms	Meandering to the causes of orchard clearing and tree cutting, with mention of the resulting effects	**1**	**10**
Daily activity + report	My theoretical presence	Mass grave crimes	Detailed presentation with pictures of mass graves, concept, methods of crime, and its effects	**1**	**11**
				1	**12**

General questions and scientific discussion	My theoretical presence	Chronological classification of mass graves 1963-2003	A chronological display of the events related to the mass graves for each location and governorate in detail.		
General questions and scientific discussion	My theoretical presence	Creating genocide graves committed by the Baath regime	Explaining the methods used in the process of mass grave crimes, touching on the groups affected by these crimes.	**1**	**13**
General questions and discussion of what was covered in previous	My theoretical presence	Pictures of crimes of the authorities and their reviews	A visual review of most of the crimes committed by the Saddamist party against the Iraqi people	**1**	**14**

lectures					
General questions and scientific discussion	My theoretical presence	Final Exam	Final exam	**1**	**15**

12- Course Evaluation

- **The grade is distributed out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and final written exams, reports, etc.**

13- Learning and teaching resources

-1Required textbooks	Crimes of the Baath regime in Iraq
-2Main references (sources(	1 -Iraqi Center for Documenting Baath Crimes, Reports Condemning the Baath Regime (Human Rights Violations(2 -Abdul Razzaq Al-Saadi, Bitter Legacy (Lessons from the De-Baathification Process in Iraq(

The Poisoned Chalice (UN Reports on the Iraqi High Tribunal's Decision in the Dujail Case(	-3Recommended books and references (scientific journals, reports, etc).

1. Course Name:
Optics/practical part
2. Course Code: BHM103
3. Semester / Year:0202- 0202
4. Description Preparation Date:
0202/11/7
5. Available Attendance Forms:
My attendance is mandatory
6. Number of Credit Hours (Total) / Number of Units (6)
2 hours
7. Course administrator's name (mention all, if more than one name)

PHD. Lecturer Ahmed Qasim obaid ,assistant lecture Maysloon kareem kazm
email :aubaid@uowasit.edu.iq ,mkazm@uowasit.edu.iq

8. Course Objectives

Course Objectives	Students are familiarized with the general and specific principles of classical mechanics in motion and its types, along with the interpretation of the laws related to it. • Providing students with the scientific skills to deal with mechanical problems and how to benefit from and deal with them in different situations. • Explain and illustrate real-life examples of classical mechanics. • Urging students to possess scientific information related to mechanics and apply it now and in the future when faced with any problem. • Urging students to acquire various modern teaching skills in explaining mechanical topics and thus acquiring Experience in dealing with various physics

	topics

9. Teaching and Learning Strategies

Strategy	• Giving scientific lectures on understanding classical mechanics • Oral and short exams through discussion examples related to the topic • Written exams to refine what students have learned. • Classical mechanics describes the motion of very small (microscopic) bodies from the beginning Projectiles include machines and astronomical objects such as planets, galaxies, spaceships, and stars. • Study Newton's laws of motion • The study of the behavior of most “natural” things.

10. Course Structure

Wee k	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	knowledge	Introduction -general laboratory instructions -instructions on how to write a report -steps for teaching graphing	My presence	Daily exam
0	2	The student acquires knowledge of the refractive index of light	The experiment 1: The refraction of light	My presence	Daily exam
3	2	The student acquires knowledge of photovoltaic cell	The experiment 2: The photovoltaic cell	My presence	Daily exam
2	2	The student acquires knowledge of types of visible spectrum	The experiment 3: The colors of objects	My presence	Daily exam
2	2	The student acquires knowledge of student	The experiment 4: Finding the focal	My presence	Daily exam

		of local length F	length of lenses		
6	2		Review		
7	2		First semester exam	A test	
8	2	The student acquires knowledge of Ryde-berg constant	The experiment 5: Ryde-berg constant	My presence	Daily exam
9	2	The student acquires knowledge of the refractive index of light on a single surface	The experiment 6: Light through a refracting or isolated surface	My presence	Daily exam
12	2	The student acquires knowledge of wavelength	The experiment 7: Finding the wavelength of sodium light using newton`s rings	My presence	Daily exam

11	2	The student acquires knowledge of Diffraction	The experiment 8: Diffraction though a narrow slit second semester exam	My presence	Daily exam
10	2		Review		
13	2		Second semester exam	A test	

11.Course Evaluation

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

12.Learning and Teaching Resources

Paper lectures composed by the instructors of the course Fundamentals of optics francis A. jecker Harvey hoyt	Required prescribed books (Methodology, if any)

Textbook Fundamental of optics Francis A, Jenkins, Harve white	Main references (sources)
nothing	Recommended
	Supporting books and references (scientific journals, reports....
The electronic class and the sources and tests published in it	electronic references, Internet sites

Course Description Form

97.Course Name:
Electrical laboratory II
98.Course Code: PHEM212
99.Semester / Year:2024- 2025
100. Description Preparation Date:
2025/9/16
101. Available Attendance Forms:
My attendance is daily
102. Number of Credit Hours (60Total) / Number of Units (1)
2 hours

103. Course administrator's name (mention all, if more than one name)	
Name :- **M.s.c.Noor Riyadh Riyas** Email:- nriyas@uowasit.edu.iq	
104. Course Objectives	
Course Objectives	**1- Cognitive objectives:** a-Preparing trained and qualified cadres to work in scientific and educational institutions. b-Enabling students to know and understand the practical side of electricity and magnetism and its use in community service 2- **The course's skill objectives:** a-Providing students with knowledge of all devices. b-Providing students with a comprehensive knowledge of physical principles. Related to electricity and magnetism. **3- Emotional and value-based goals:** a- Ask questions during the experiment to

	connect the side Practical with theoretical side. B-Linking practical experience with engineering and technological applications. 4-**General and transferable qualification skills (other skills):** a-Optimal use of concepts related to the topic Experience and its use for integrated knowledge Regarding the change of scientific phenomena. b-Optimizing the use of devices and knowing how to use them.
105. Teaching and Learning Strategies	
Strategy	1- Providing the student with knowledge of all devices. 2- Providing the student with knowledge of the electrical components of practical experiments. -3 Providing the student with the knowledge to calculate and draw the output voltage of the rectified wave and half-wave current.

	4- Providing the student with knowledge of how a voltmeter works. 5- Providing the student with knowledge of transferring the greatest amou of electrical energy. 6- Providing the student with knowledge of Stefan-Boltzmann's law and researching the relationship between current and voltage difference. 7- Providing the student with knowledge about proving the validity of Kirchhoff's law. 8-Providing the student with the knowledge of how to know the direction of the magnetic field. 9-Providing the student with knowledge of using the galvanometer, Amet and voltmeter. 10- Providing the student with knowledge of the electrical transformer an determining the potential difference in the secondary coil The potential difference in the primary coil. 11- Providing the student with the knowledge to measure the electromot force of a battery. **Teaching and learning methods** 1- Experience 2- Discussion

106. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1-2	2	Students gain knowledge on how to write a report.	1- General laboratory instructions. 2- Instructions on how to write the report. 3- Steps for teaching the graph.	Lecture	
5-3	2	Students gain knowledge on how to evaluate the wave and how the wave appears	Wave and half wave rectification experiment	Lecture and practical application	Daily exam and daily activity
7-6	2	Gain knowledge in knowing	Finding the inter resistance of a voltmeter	Lecture and	Daily exam and daily

		internal resistance		practical application	activity
9-8	2	Students gain knowledge in knowing the maximum value of power	Transfer the maximu possible power in electrical circuit	Lecture and practical application	Daily exam and daily activity
10-11	2	Students gain knowledge in the investigation of the Stefan-Boltzmann law.	Nonlinear relationsl between voltage a current in a tungsten lam	Lecture and practical application	Daily exam and daily activity
12-13	2	Students gain knowledge in applying Kirchhoff's law for current and voltage	Kirchoff`s Laws	Lecture and practical application	Daily exam and daily activity

14	2		Review	Lecture and practical application	Daily exam and daily activity
15	2		Monthly Exam	Lecture and practical application	Daily exam and daily activity
16-17	2	Students gain knowledge of measuring voltage	Using a galvanometer as voltmeter	Lecture and practical application	Daily exam and daily activity
18-19	2	Students gain knowledge of measuring current values	Use of galvanome Ameter	Lecture and practical application	Daily exam and daily activity
20-23	2	Students gain knowledge of determining the voltage	electrical transformer	Lecture and practical application	Daily exam and daily

		difference ratio in the secondary coil			activity
24-25	2	Students gain knowledge of measuring the electromotive force of a battery	electromotive force	Lecture and application practical	Daily exam and daily activity
26-27	2	Students gain knowledge of knowing the direction of the field	Magnetic fields genera by a magnetic rod	Lecture and practical application	Daily exam and daily activity
28-29	2		Review	Lecture and practical application	Daily exam and daily activity
30	2		Monthly Exam	Lecture and practical	Daily exam and daily

				application	activity

107. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
108. Learning and Teaching Resources	
Book: Experiments in Practical Physics (Dr. Suhaam Qandala, Diaa Abdul Ali Tawij)	Required prescribed books (Methodology, if any)
Book: Electricity and Magnetism / Part Two	Main references (sources)
Directing students to follow what is stated on the physics website	Recommended supporting books and references

	(scientific journals, reports....
Unique location in physics	electronic references, Internet sites