Academic program description form

University name: Tikrit University

College/Institute: College of Education for Pure Sciences

Scientific Department: Department of Physics

Name of academic or professional program: Bachelor's degree

Name of final degree: Bachelor of Physics

Academic system: annual

Description preparation date: The beginning of the 2024-2025 academic year

Date of filling the file: 12/1/2025

Signature:

Name of Department Head:

Assist. prof. Mohsen Hassan Ali

Date: 19 / 1/2024

Signature:

Name of Scientific Assistant:

Prof. Dr. Muhammad Ahmed Jassim

Date: 19 / 1/2024

Check the file by:

Quality Assurance and Performance Evaluation Division

Name of the Director of the Quality Assurance and Performance Evaluation Division:

Assist. Prof. Muammar Abdulaziz Kamel

Date: 1/19/2025

the signature

Professor Doctor
ALi Abdul Majeed Shihab
College of Education
for Pure Sciences

Authentication of the Dean

1. see the program

Improving the level of performance in the various fields of physical sciences - mechanics, optics, electricity, magnetism, atomic and nuclear physics, quantum and solid physics, lasers and electromagnetism, taking into account the need to keep pace with the development witnessed by the higher educational renaissance by finding the best services and equipment for academic cadres of faculty members, Providing training and development opportunities for technicians and administrators, and graduating job creators instead of graduating job seekers, by qualifying them in the pre-graduation and basic education stages on research and development skills, innovation, entrepreneurship, and entrepreneurship, and involving students in everything that would develop their skills and help them be creative. Innovation, not just presentation, and transforming knowledge into wealth through research, development and innovation.

2. Program message

Graduating qualified students who possess scientific logical thinking and scientific research skills in science. The department provides the best modern scientific technologies for educational services to students at the university and higher education levels, and works to develop skills that enable them to integrate into all fields accurately and effectively. It supports the movement of scientific research and cognitive interaction in order to continuously communicate with scientific and cultural development in the world, It meets the renewed needs of society in a way that achieves comprehensive and sustainable human development and enables national, regional and global competition and the transformation of knowledge into wealth through research, development and innovation, and the growing role of partnerships between research, development and innovation in universities on the one hand and production and service institutions on the other hand. Meeting the country’s need for competent and qualified scientific cadres. To be future leaders in the field of education, By creating the appropriate scientific environment for scientific and skill growth and offering high-quality academic programs that keep pace with the developments of the times

3. Program objective

1. Preparing specialized cadres to support educational institutions
2. That the student is able to use the knowledge he has received
3. That the student is able to benefit from knowledge and how to employ it
4. That the student acquires the skill of education and teaching
5. That the student can embody the knowledge he has acquired and develop it in the profession he is pursuing
6. Graduating qualified students to complete their postgraduate studies (Master’s - PhD) in various specializations of physics

4. Program accreditation

Ministry of High Education and Scientific research

5. Other External Influences

6. Program Structure

Program Structure	Number of Courses	Study Unit	Percentage	Notice
Enterprise requirements	**5**	**12**	**7%**	Essential
College requirements	**12**	**50**	**29%**	Essential
Department requirements	**21**	**110**	**64%**	Essential
Summer training				
Other				

* Notes may include whether the course is core or elective.

7. Program Description

Credit hours		Name of the course	Course Code	Year/level
Practical	Theoretical			
2	3	Electric and magnetic	**ELP021**	First
	2	Heat and properties of matter	**THP041**	First
	3	Mathematics	**MAP031**	First
2	3	Mechanics	**MEP011**	First
-	2	Arabic	**Ar 017**	First
-	2	Calculators	**C 016**	First
-	1	Educational psychology	**Psy 017**	First
-	2	Foundations of education	**F 016**	First
-	1	Human rights and democracy	**Hr 013**	First
2	3	Electric and magnetic	**ELP032**	Second
2	3	Optics	**OPP012**	

-	3	Mathematics	**MAP022**	Second
-	2	Sound and wave motion	**WMP042**	Second
-	2	astronomy	**SSP052**	Second
-	2	psychology	**Psy 017**	Second
-	2	Scientific research method	**Srm 015**	Second
-	2	Educational administration	**Eda 015**	Second
2	3	Electronics	**ELP013**	Third
	3	Thermodynamics	**THP033**	Third
2	3	Atomic and molecular	**ATP023**	Third
-	3	Analytical mechanics	**AM P043**	Third
-	2	Teaching methods	**Tem 018**	Third
-	2	Counseling and mental health	**Com 019**	Third
-	3	Solid state	**SOP024**	Fourth
2	3	Nuclear	**NUP014**	Fourth
-	3	Quantum physics	**QUP034**	Fourth
-	2	Laser	**LAP044**	Fourth
-	3	Electromagnetic theories	**EMR46**	Fourth
-	2	View and apply	**Va 019**	Fourth
-	2	Measurement and evaluation	**Me 018**	Fourth

8. Expected learning outcome of the programmer

Knowledge

Cognitive Goals	1- Enabling students to know the importance of studying physics 2- Enabling students to know the historical role of Arab scientists in the field of physics 3-Enabling students to overcome the difficulties that hinder their studies 4- Enabling students to formulate observable and measurable cognitive and behavioral goals 5- Enabling students to know the importance of classroom activity and how to activate it in school life 6- Enabling students to know the impact of scientific knowledge of physics in developing intellectual aspects

Skills	
General and qualifying skill goals	1-Learning about modern teaching methods and methods 2-Knowing everything new in the field of physics to keep pace with the rapid development in this specialty 3- Holding scientific exhibitions, seminars and workshops
The program's skill objectives	1- Teaching skill in physics 2- The student must have the ability to employ practical laboratory skills 3- The student must have the ability to link causes to causes
Values	
Educational values	Continuous innovation and improvement. Competing in the education industry and adhering to standards of excellence.

9. Teaching and Learning strategies

1- The introductory method
2- Lecture method
3- Practical application in laboratories
4- Discussion and dialogue
5- Flipped learning

10. Evaluation methods

1- Weekly reports
2- Practical tests
3- Weekly, monthly and annual tests
4- Graduation research
5- Field visits

11. Faculty

Faculty members

Preparing the Teaching staff		**Requirements/ Skills (if any)**	**Specialization**		name	**Scientific rank**
Lecturer	**permanent**		**Private**	**General**		
	✓		Nano	Physics	Nadeem	prof

			Electronics	sciences	Khaled Hassan	
	✓		Nuclear	Physics sciences	Asmaa Ahmed Aziz	prof
	✓		Solid/Solid	Physics sciences	Abdullah Mahmoud Ali	prof
	✓		Solid	Physics sciences	Niran Fadel Abdul-Jabbar's	prof
	✓		Solid	Physics sciences	Adnan Raad Ahmed	prof
	✓		Solid	Physics sciences	Khaled Hamdi Rezig	prof
	✓		offspring	Physics sciences	Mohsen Hassan Ali	Assi st. Prof
	✓		Solid	Physics sciences	Ayed Najm Saleh	Assi st. Prof
	✓		solid/materials	Physics sciences	Muammar Abdulaziz Kamel	Assi st. Prof
	✓		Solid	Physics sciences	Hanan Reda Abdel Ali	Assi st. Prof
	✓		Nanotechnology	Physics sciences	Qahtan Novan Abdullah	Assi st. Prof
	✓		Solid	Physics sciences	Walaa Mahfouz Muhammad Amin	Assi st. Prof
	✓		Solid	Physics sciences	Rasha Hamed Ahmed	Assi st. Prof
	✓		Lasers and molecular spectra	Physics sciences	Qasim Hammadi Mahmoud	Assi st. Prof
	✓		Solid	Physics sciences	Ibrahim Khalaf Salman	Assi st. Prof
	✓		Solid	Physics sciences	Planet David is safe	Assi st. Prof
	✓		Solid	Physics sciences	Abbas Kasoub Jarallah	Teac her
	✓		Nanotechnology	Physics	Alaa Yusuf	Teac

			and renewable energies	sciences	Ali	her
	✓		Solid	Physics sciences	Hassan Hamada Ali	Teac her
	✓		Methods of teaching physics	Physics sciences	Ahmed Talab Sabar	Teac her
	✓		Solid	Physics sciences	Shahad Ahmed Dhiab	Teac her
	✓		Solid	Physics sciences	Khaled Majoul Turkish	Teac her
	✓		Solid	Physics sciences	Ali Hussein Muhammad	Teac her
	✓		Solid	Physics sciences	Omar Adel Jadaan	Teac her
	✓		Solid	Physics sciences	Safa Khalil Ibrahim	Assi st. Teac her
	✓		Solid	Physics sciences	Amna Raad Dahham	Assi st. Teac her
	✓		Nuclear	Physics sciences	Hafsa Taha Ahmed	Assi st. Teac her
	✓		Solid	Physics sciences	Alia Muhammad Alwan	Assi st. Teac her
	✓		English	Physics sciences	Roula Fawaz Hammad	Assi st. Teac her
	✓		Solid	Physics sciences	Mustafa Wathiq Fathi	Assi st. Teac her
	✓		Nuclear	Physics sciences	Rafid Sami Hamid	Assi st. Teac her

Professional development

Orienting new Faculty members

New, visiting, full-time and other faculty members are guided by integrating them with experienced ones to provide them with the skills required in the teaching strategies approved within the educational program and continuous monitoring of the development of their cognitive level and the extent of their acquisition of the skills required for the scientific subject, in addition to the central courses that are held at the institution and college levels.

Professional development for Faculty members

The plan and arrangements for academic and professional development for faculty members include setting an annual plan for professional development, such as preparing an annual research plan for each teacher, as well as seminars, workshops, scientific courses, and activities that serve the community. It also includes developing a teaching and learning strategy through modern teaching methods such as brainstorming, group work, and the discussion and learning strategy. Discovery and inductive teaching strategy, To obtain learning results, their efficiency can be evaluated and measured through approved tests within the approved program.

The results of learning and professional development are evaluated through the evaluation of the faculty member by the department head, as well as a questionnaire distributed to students in coordination with the Quality Division in the college and under the supervision of the Quality Department at the university.

12. Acceptance criterion

(Central admission)

13. The most important sources of information about the program

Ministry of High education and Scientific research

14. Program development plan

1- Forming committees in the scientific department whose mission is to follow up the program and conduct a comprehensive review and any developments that occur to it. .2

2- A questionnaire about students' opinions at the end of each semester about the academic program.

3- A questionnaire of faculty members' opinions at the end of each semester about the best ways to develop courses and teaching methods. .4

4- Coordination with the Quality Division at the university to follow up on the implementation of the academic program in the department

5- Conduct a comprehensive review of the program.

Program Skills Chart															
Learning outcomes required from the program															
Values				skills				Knowledge				Essential or optional	**Name course**	**Course code**	Year/level
C4	C3	C2	C1	B4	B3	B2	B1	A4	A3	A2	A1				
*	*	*	*		*	*	*	*	*	*	*	Essential	Electric and magnetic	**ELP021**	
*	*	*	*	*	*	*	*	*	*	*	*	Essential	Heat and properties of matter	**THP041**	
*	*	*	*		*	*	*	*	*	*	*	Essential	mathematics	**MAP031**	First year
*	*	*	*	*	*	*	*	*	*	*	*	Essential	Mechanics	**MEP011**	
*		*	*	*	*	*	*	*	*	*	*	Essential	Arabic	**Ar 017**	
*	*	*		*	*	*	*	*	*	*	*	Essential	Calculators	**C 016**	
*	*	*	*	*	*	*	*	*	*	*	*	Essential	Educational psychology	**Psy 017**	
*		*	*		*	*	*	*	*	*	*	Essential	Foundations of education	**F 016**	
*	*	*	*	*	*	*	*	*	*	*	*	Essential	Human rights and democracy	**Hr 013**	
	*	*	*		*	*	*	*	*	*	*	Essential	English language	**442EL**	

* Please check the boxes corresponding to the individual learning outcomes from the program being assessed

Program Skills Chart															
Learning outcomes required from the program															
Values				Skills				Knowledge				Essential or optional	Name course	Course code	Year/level
C4	C3	C2	C1	B4	B3	B2	B1	A 4	A 3	A 2	A 1				
*	*	*	*		*	*	*	*	*	*	*	Essential	Electric and magnetic	**ELP03 2**	
*	*	*	*		*	*	*	*	*	*	*	Essential	Optics	**OPP01 2**	
*	*	*	*		*	*	*	*	*	*	*	Essential	mathematics	**MAP02 2**	2nd / year
*	*	*	*	*	*	*	*	*	*	*	*	Essential	Sound and wave motion	**WMP0 42**	
*		*	*		*	*	*	*	*	*	*	Essential	astronomy	**SSP05 2**	
*	*	*	*	*	*	*	*	*	*	*	*	Essential	psychology	**Psy 017**	
*	*	*	*	*	*	*	*	*	*	*	*	Essential	Scientific research method	**Sci 015**	
*	*		*	*	*	*	*	*	*	*	*	Essential	Educational administrati on	**Ed 015**	
*	*	*	*	*	*	*	*	*	*	*	*	Essential	English language	**443EL**	
*	*	*	*	*	*	*	*	*	*	*	*	Essential	The crimes of the Baath regime		

Program Skills Chart															
Learning outcomes required from the program															
Values				Skills				Knowledge				Essential or optional	Name course	Course code	Year/ level
C4	C3	C2	C1	B4	B3	B2	B1	A 4	A 3	A 2	A 1				
*	*	*	*		*	*	*	*	*	*	*	Essential	Electronics	**ELP013**	3^{rd}/ year
*	*	*	*		*	*	*	*	*	*	*	Essential	Thermodynamics	**THP033**	
*	*	*	*		*	*	*	*	*	*	*	Essential	Atomic and molecular	**ATP023**	
*	*	*	*	*	*	*	*	*	*	*	*	Essential	Analytical mechanics	**AM P043**	
*		*	*		*	*	*	*	*	*	*	Essential	Teaching methods	**Tm 018**	
*	*	*	*	*	*	*	*	*	*	*	*	Essential	Counseling and mental health	**Cm 019**	
*	*	*	*	*	*	*	*	*	*	*	*	Essential	English language	**444EL**	

Program Skills Chart															
Learning outcomes required from the program															
Values				Skills				Knowledge				Essential or optional	Name course	Course code	Year/level
C4	C3	C2	C1	B4	B3	B2	B1	A 4	A 3	A 2	A 1				
	*	*	*		*	*	*	*	*	*	*	Essential	Solid state	**SOP024**	**4^{th}/year**
*	*	*	*		*	*	*	*	*	*	*	Essential	Nuclear	**NUP014**	
*	*	*	*		*	*	*	*	*	*	*	Essential	Quantum physics	**QUP034**	
*	*	*	*		*	*	*	*	*	*	*	Essential	Laser	**LAP044**	
		*	*	*	*	*	*	*	*	*	*	Essential	Electromagnetic theories	**EMR46**	
*	*	*	*		*	*	*	*	*	*	*	Essential	View and apply	**Va 019**	
*	*	*	*		*	*	*	*	*	*	*	Essential	Measurement and evaluation	**Me 018**	
	*		*	*	*		*	*	*	*	*	Essential	English language	**445EL**	

Course description form

1-Course Name
Mechanics / First Stage
2 -Course Code
Bsc
3-Semester / Year
2024/2023
4-Date of preparation of this description
2023/3/9
5-Available forms of attendance
Daily
6- Number of study hours (total) / Number of units (total)
60 hours
7- Name of the course supervisor (if more than one name is mentioned
Assistant Professor Dr.muaamar A.kamil muaamar.a.kamil@tu.edu.iq
8 -Course objectives

Objectives of the study subject	• **Identify the types of motion.** • **Study the motion of projectiles, falling objects and planets.** • **Study the types and direction of forces.** • **Study the types of torques applied to objects.** • **Study the effect of terrestrial and linear acceleration on the motion of objects.** • **Motion of fluids.** • **Waves and wave motion**
9- Teaching and learning strategies	
Lecture style, discussing with students, and asking and exchanging questions with students	**Strategy**

10 -Course structure	

Week	Hours	Name of the unit or topic	Required learning outcomes	Learning method	Evaluation method
First	**3**	**Physical quantities**	**Basic concepts**	**Lecture**	Daily and monthly exams, assignments and reporting
Second	**3**	**International System of Units**	**Basic concepts**	**Lecture**	Daily and monthly exams, assignments and reporting
Third	**3**	**Arithmetic operations on vectors**	**How to deal with directional quantities**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourth	**3**	**Finding the unit matrix and mathematical operations**	**Getting to know matrices**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifth	**3**	**equations of motion**	**Recognizing regular motion**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixth	**3**	**Rotational motion equations**	**Recognizing rotational motion**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventh	**3**	**Instantaneous and instantaneous velocity equations**	**Find out the instantaneous speed**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighth	**3**	**Motion in a straight line**	**Movement**	**Lecture**	Daily and monthly exams, assignments and reporting
Ninth	**3**	**Rotational motion**	**Movement**	**Lecture**	Daily and monthly exams, assignments and reporting
Tenth	**3**	**free fall**	**One-way movement**	**Lecture**	Daily and monthly exams, assignments and reporting
Eleventh	**3**	**Projectiles**	**Movement in a plane**	**Lecture**	Daily and monthly exams, assignments and reporting

Twelfth	**3**	**Relative velocity**	**Movement in a plane**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirteenth	**3**	**Newton's first law**	**Moving objects**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourteenth	**3**	**Newton's second law**	**Moving objects**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifteenth	**3**	**Newton's third law**	**Moving objects**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixteenth	**3**	**Static and static friction**	**Legitimate friction**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventeenth	**3**	**Constant force work**	**Work and energy**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighteenth	**3**	**variable power work**	**Work and energy**	**Lecture**	Daily and monthly exams, assignments and reporting
Nineteenth	**3**	**Restoring force and spring constant calculation**	**Work and energy**	**Lecture**	Daily and monthly exams, assignments and reporting
Twentieth	**3**	**Center of mass of a particle and two point particles**	**Motion of a system of particles**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-one	**3**	**Principle of conservation of linear momentum**	**Motion of a system of particles**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Two	**3**	**Elastic and inelastic collision**	**Collisions**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Three	**3**	**Collisions in the Rutherford plane and scattering**	**Collisions**	**Lecture**	Daily and monthly exams, assignments and reporting

Twenty-Four	**3**	**angular velocity**	**Rotational motion**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Five	**3**	**The relationship between rotational and translational motion**	**Rotational motion**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Six	**3**	**Simple vibrational motion equations**	**Vibrational motion**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Seven	**3**	**Flexibility and density**	Liquids	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-eight	**3**	**Pressure and Archimedes' Principle**	Liquids	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-nine	**3**	**Wave motion**	**Waves**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirty	**3**	**Thermal equilibrium and its equations**	**the heat**	**Lecture**	Daily and monthly exams, assignments and reporting

11-Course Evaluation

Daily exams score: 5, Homework and reports score: 10, Monthly exams score: 35

Final exam score: 50

12-Learning and teaching resources

Required textbooks (methodology if available)	Mechanics for primary grades
Main References (Sources)	muhammad Qaysarun Mirza / 200
Recommended supporting books and references (scientific journals, reports...	References and reports on the web page

Course description form

1- Course name
Electric/first class
2- Course code / ATP023
Bachelor's
3- Semester / year
2024/2023
4- Date this description was prepared
2023/9/3
5- Available attendance forms
Day
6- Number of study hours (total) / number of units (total)
90 hour
7- Name of the course administrator (if more than one name is mentioned)
Name:- Assist. Prof. Dr:- Hanan Ridha , Email:- dr.hanan.ridha@tu.edu.iq
8- Course objectives

Objectives of the study subject	**Study the charge and material** **The meaning of the law of the electric field** **Causs law** **The meaning of electric potential** **The law of capacitance** **The insolaters and its properties** **The properties of current and resestance**
9- Teaching and learning strategies	
Strategy	Lecture style, discussing with students, and asking and exchanging questions with students

10- Course Structure

Week	Hours	Name of the unit or topic	Required learning outcomes	Learning method	Evaluation method
First	**3**	**Basic concepts**	**Structural material**	**Lecture**	Daily and monthly exams, assignments and reporting
Second	**3**	**Basic concepts**	**The charge and material**	**Lecture**	Daily and monthly exams, assignments

					and reporting
Third	**3**	**The know kind of the charge**	**charge**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourth	**3**	**The know of the kind of material**	**Semiconductors,conductors and insoulater**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifth	**3**	**The know of the regular movment**	**The movment equations**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixth	**3**	**Coulums law**	**Coulums law**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventh	**3**	**Know of the units of the mesurments**	**Charge,current**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighth	**3**	**The electric field**	**Electric field**	**Lecture**	Daily and monthly exams, assignments and reporting
Ninth	**3**	**Electric field intensity**	**Electric field intensity**	**Lecture**	Daily and monthly exams, assignments and reporting
Tenth	**3**	**Point charge**	**Point charge**	**Lecture**	Daily and monthly exams, assignments and reporting
Eleventh	**3**	**Continuos surface**	**Continuos surface**	**Lecture**	Daily and monthly exams,

					assignments and reporting
Twelfth	**3**	**The solution of the excersice**	**Excersice solution**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirteenth	**3**	**capacetances**	**capacetances**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourteenth	**3**	**kind of the capacetance**	**Kind of the capacetance**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifteenth	**3**	**Double panel of capacetance**	**Double panel of capacetance**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixteenth	**3**	**Spherical capacetance**	**Spherical capacetance**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventeenth	**3**	**Cylindrical capacetance**	**Cylindrical capacetance**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighteenth	**3**	**System partical movment**	**System partical movment**	**Lecture**	Daily and monthly exams, assignments and reporting
Nineteenth	**3**	**the factors effecting on the capacetance**	**Factors effect on the capacetance**	**Lecture**	Daily and monthly exams, assignments and reporting
Twentieth	**3**	**Connecting of the**	**Connecting of the capacetance**	**Lecture**	Daily and monthly

		capacetance			exams, assignments and reporting
Twenty-one	**3**	**Electrical energy**	**Electrical energy**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Two	**3**	**insulators**	**insulators**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Three	**3**	**Properties of the current and the resistance**	**Properties of the current and resistance**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Four	**3**	**potential**	**potential**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Five	**3**	**Oums law**	**Oums law**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Six	**3**	**Dc current**	**Dc current**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-nine	**3**	**Learn about molecular physics and molecular bonds**	**molecular physics and molecular bonds**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirty	**3**	**Knowledge of molecular spectra**	**molecular spectra**	**Lecture**	Daily and monthly exams, assignments and

					reporting

11- Course Evaluation	
core for daily exams: 5, score for assignments and reports: 10, score for monthly exams: 35 Final exam score: 50	
12- learning and Teaching Resources	
Required textbooks (methodology, if any)	The baiscs of the electric and maginatic
Main references (sources)	No
Recommended supporting books and references (scientific journals, reports...)	Nothing
Electronic references, Internet sites	General physics websites

Course description form

1- Course name	
Heat and properties of Matter / First stage	
2- Course code / THP041	
Bachelor's	
3- Semester / year	
2023-2024	
4- Date this description was prepared	
3-9-2023	
5- Available attendance forms	
Day	
6- Number of study hours (total) / number of units (total)	
60 hour	
7- Name of the course administrator (if more than one name is mentioned)	
Name:- Assist. Prof. Dr:- Rasha Hamid Ahmed , Email:- rashahamed@tu.edu.iq	
8- Course objectives	
Objectives of the study subject	**1- Learn about the laws of thermodynamics and how to use them.** **2- Adding the laws of heat and heat conversions to solving problems and linking them to daily life** **3- Developing thinking to understand states of matter and how to transform matter from one state to another** **4- Ability to solve energy and work problems** **5- Obtaining knowledge to determine the**

	mechanical properties of materials, which enables students to understand the environment that surrounds them as well as deal with society. **6- Understanding the magnetic properties of materials and being able to benefit from them when dealing with materials in nature**
9- Teaching and learning strategies	
Strategy	Lecture style, discussing with students, and asking and exchanging questions with students

10- Course Structure

Week	Hours	Name of the unit or topic	Required learning outcomes	Learning method	Evaluation method
First	**2**	**Ch.1 / Temperature**	**The temperature scales -1** **Types of thermometers. -2**	**Lecture**	Daily and monthly exams, assignments and reporting
Second	**2**	**Ch.1 / Temperature**	**Effect of temperature changes. -3** **Thermal expansion. -4** **Mechanism of heat transfer -5**	**Lecture**	Daily and monthly exams, assignments and reporting
Third	**2**	**Ch.1 / Temperature**	**Low temperatures -6** **Temperature gradiant -7**	**Lecture**	Daily and monthly exams, assignments

					and reporting
Fourth	**2**	**Ch.2 / Heat and Phase Changes**	**Heat and its effects -1** **Quantity of heat -2**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifth	**2**	**Ch.2 / Heat and Phase Changes**	**Quantity of heat -3** **Temperature -4** **Specific of heat materials -5**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixth	**2**	**Ch.2 / Heat and Phase Changes**	**The Specific of heat materials measurement -6** **The mechanical equivalent of heat -7** **Potential energy -8**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventh	**2**	**Ch.2 / Heat and Phase Changes**	**The state transformation -9** **The first law of thermodynamics -10** **Application of first law -11**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighth	**2**	**Ch.3 / The Gases**	**The ideal and real gases -1** **The kinetic theory of gases -2**	**Lecture**	Daily and monthly exams, assignments and reporting
Ninth	**2**	**Ch.3 / The Gases**	**The gas law -3** **Boyls law -4** **Charles law -5** **The gas constant -6**	**Lecture**	Daily and monthly exams, assignments and reporting
Tenth	**2**	**Ch.3 / The Gases**	**The Potential energy of gas -7** **Relation between Cp and -8**	**Lecture**	Daily and monthly exams, assignments

			Cv		and reporting
Eleventh	**2**	**Ch.4 / The Liquids**	**The density** -1 **The pressure of** -2 **liquids**	**Lecture**	Daily and monthly exams, assignments and reporting
Twelfth	**2**	**Ch.4 / The Liquids**	**The surface** -3 **tension** **The liquid** -4 **surface**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirteenth	**2**	**Ch.4 / The Liquids**	**The capillarity** -5 **The viscosity** -6 -7	**Lecture**	Daily and monthly exams, assignments and reporting
Fourteenth	**2**	**Ch.5 / The Mechanical Properties of Materials**	**Stress** -1 **Strain** -2	**Lecture**	Daily and monthly exams, assignments and reporting
Fifteenth	**2**	**Ch.5 / The Mechanical Properties of Materials**	**Elasticity** -3 **Modulus of** -4 **Elasticity**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixteenth	**2**	**Ch.5 / The Mechanical Properties of Materials**	**Youngs Modulus** -5 **Poissons ratio** -6	**Lecture**	Daily and monthly exams, assignments and reporting
Seventeenth	**2**	**Ch.5 / The Mechanical Properties of Materials**	**Torsional** -7 **constant** **Torsional Strain** -8	**Lecture**	Daily and monthly exams, assignments and reporting
Eighteenth	**2**	**Ch.6 / The Magnetic**	**The magnetic** -1 **moment of**	**Lecture**	Daily and monthly

		Properties of Materials	**electron** **The angular** -2 **momentum of electron**		exams, assignments and reporting
Nineteenth	**2**	**Ch.6 / The Magnetic Properties of Materials**	**The relation** -3 **between (M) and (L)** **The magnetic** -4 **susceptibility**	**Lecture**	Daily and monthly exams, assignments and reporting
Twentieth	**2**	**Ch.6 / The Magnetic Properties of Materials**	**Classification of** -5 **magnetic materials** **The diamagnetic** -6 **materials** **The** -7 **paramagnetic materials** **The** -8 **ferromagnetic materials** **The anti-** -9 **ferromagnetic materials** **The** -10 **ferrimagnetic materials**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-one	**2**	**Ch.6 / The Magnetic Properties of Materials**	**The magnetic** -11 **elements** **Magnetic** -12 **transition metals** **Magnetic rate** -13 **earth metals**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Two	**2**	**Ch.7 / The Electrical Properties of**	**The conductors** -1 **The** -2 **Semiconductors**	**Lecture**	Daily and monthly exams, assignments

		Materials	**The insulators** -3		and reportin
Twenty-Three	**2**	**Ch.7 / The Electrical Properties of Materials**	**Electrical** -4 **resistivity** **The** -5 **superconductivity**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Four	**2**	**Ch.7 / The Electrical Properties of Materials**	**Electric field** -6 **Capacitor** -7	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Five	**2**	**Ch.7 / The Electrical Properties of Materials**	**Polarization** -8 **Dielectric** -9 **constant**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Six	**2**	**Ch.7 / The Electrical Properties of Materials**	**Dielectric** -10 **constant and Refractive index** **Electrical** -11 **breakdown**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Seven	**2**	**Ch.8 / The Plasma**	**The Plasma** -1 **Plasma** -2 **Production**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-eight	**2**	**Ch.8 / The Plasma**	**Investigation of** -3 **Plasma** **Plasma and** -4 **magnetic field**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-nine	**2**	**Ch.8 / The Plasma**	**Confinement of** -5 **Plasma**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirty	**2**	**Ch.8 / The Plasma**	**The Earth** -6 **magnetic field**	**Lecture**	Daily and monthly

			and the solar Plasma		exams, assignments and reporting

11- Course Evaluation	
core for daily exams: 10, score for assignments and reports: 10, score for monthly exams: 30 **Final exam score: 50**	
12- learning and Teaching Resources	
Required textbooks (methodology, if any)	**Heat and properties of Matter** / Dr. Kadhim Ahmed Mohammed
Main references (sources)	Materials Science/ Maty Naser
Recommended supporting books and references (scientific journals, reports...)	University Physics/ Raheem abd
Electronic references, Internet sites	**https://www.alfred-library.com**

Course Description for Foundations of Education - First Year

1. Course Title:
   Foundations of Education / First Year

2. Course Code:
   Bachelor's Degree

3. Annual Schedule:
   2023/2024

4. Preparation Date for This Description:
   27/4/2023

5. Attendance Formats Available:
   In-person

6. Total Study Hours / Units:
   - Total hours: 2
   - Total units: 4

7. Course Coordinator Name (if more than one, list all):

   Name: Assistant Ahmed Taleb Sabar

   Email: ahmed.s.m.o.j@tu.edu.iq

8. Course Objectives:

   - Define education.

   - Define Islamic-Arabic education.

   - Recognize education in some ancient civilizations.

   - Understand primitive education.

9. Teaching and Learning Strategies:

   - Lectures, student discussions, and question exchange.

10. Course Structure:

Week	Hours	Learning Outcomes	Unit/Topic	Teaching Method	Assessment Method
1	2	Understanding, Analyzing, Synthesizing	Historical overview of education	Lecture, Discussion	Daily and monthly exams, assignments
2	2	Understanding, Analyzing, Synthesizing	Educational objectives	Lecture, Discussion	Daily and monthly exams, assignments
3	2	Understanding, Analyzing, Synthesizing	Primitive education	Lecture, Discussion	Daily and monthly exams,

					assignments
4	2	Understanding, Analyzing, Synthesizing	Features of primitive education	Lecture	Daily and monthly exams, assignments
5	2	Understanding, Analyzing, Synthesizing	Education in ancient Mesopotamia	Lecture, Discussion	Daily and monthly exams, assignments
6	2	Understanding, Analyzing, Synthesizing	Chinese education	Lecture, Discussion	Daily and monthly exams, assignments
7	2	Understanding, Analyzing, Synthesizing	Education system in Sparta	Lecture, Discussion	Daily and monthly exams, assignments
8	2	Understanding, Analyzing, Synthesizing	Athenian education	Lecture, Discussion	Daily and monthly exams, assignments
9	2	Understanding, Analyzing, Synthesizing	Greek education	Lecture, Discussion	Daily and monthly exams, assignments
10	2	Understanding, Analyzing, Synthesizing	Islamic-Arabic education	Lecture, Discussion	Daily and monthly exams, assignments
11	2	Understanding, Analyzing, Synthesizing	Stages of Islamic-Arabic education	Lecture, Discussion	Daily and monthly exams, assignments
12	2	Understanding, Analyzing, Synthesizing	Pre-Islamic education era	Lecture, Discussion	Daily and monthly exams, assignments
13	2	Understanding, Analyzing, Synthesizing	The era of Islam's emergence	Lecture, Discussion	Daily and monthly exams, assignments
14	2	Understanding, Analyzing, Synthesizing	Righteous Caliphs and Umayyad eras	Lecture, Discussion	Daily and monthly exams, assignments
15	2	Understanding, Analyzing, Synthesizing	Era of development and prosperity	Lecture, Discussion	Daily and monthly exams, assignments
16	2	Understanding, Analyzing, Synthesizing	Era of decline and dissolution	Lecture, Discussion	Daily and monthly exams, assignments
17	2	Understanding,	Prominent	Lecture,	Daily and

		Analyzing, Synthesizing	figures in Islamic-Arabic educational thought	Discussion	monthly exams, assignments
18	2	Understanding, Analyzing, Synthesizing	Ibn Khaldun	Lecture, Discussion	Daily and monthly exams, assignments
19	2	Understanding, Analyzing, Synthesizing	Ibn Sina	Lecture, Discussion	Daily and monthly exams, assignments
20	2	Understanding, Analyzing, Synthesizing	Al-Ghazali	Lecture, Discussion	Daily and monthly exams, assignments
21	2	Understanding, Analyzing, Synthesizing	Western educational figures	Lecture, Discussion	Daily and monthly exams, assignments
22	2	Understanding, Analyzing, Synthesizing	Plato	Lecture, Discussion	Daily and monthly exams, assignments
23	2	Understanding, Analyzing, Synthesizing	Jean-Jacques Rousseau	Lecture, Discussion	Daily and monthly exams, assignments
24	2	Understanding, Analyzing, Synthesizing	Pestalozzi	Lecture, Discussion	Daily and monthly exams, assignments
25	2	Understanding, Analyzing, Synthesizing	John Dewey	Lecture, Discussion	Daily and monthly exams, assignments
26	2	Understanding, Analyzing, Synthesizing	Al-Ghazali	Lecture, Discussion	Daily and monthly exams, assignments
27	2	Understanding, Analyzing, Synthesizing	Relationship between education and society	Lecture, Discussion	Daily and monthly exams, assignments
28	2	Understanding, Analyzing, Synthesizing	Relationship between education and the environment	Lecture, Discussion	Daily and monthly exams, assignments
29	2	Understanding, Analyzing, Synthesizing	Moral education	Lecture, Discussion	Daily and monthly exams, assignments

30	2	Understanding, Analyzing, Synthesizing	Education and economic development	Lecture, Discussion	Daily and monthly exams, assignments

11. Course Evaluation:

- Monthly exam score: 50
- Final exam score: 50

12. Learning and Teaching Resources:

- Required textbooks (if applicable):

Foundations of Education for early grades.

- Main references (sources):

Al-Ibrashi, Mohammed Atiyah, *Jean-Jacques Rousseau: His Views on Education and Teaching*. Cairo: Dar Ihyaa Al-Kutub Al-Arabiya, 1951.

- Additional recommended references (scientific journals, reports, etc.):

None.

نموذج وصف المقرر

1. Course Name:
English Language / First Stage
2. Course Code:
Undergraduate
3. Semester / Year:
2023- 2024
4. Description Preparation Date:
5/ 9/ 2023
5. Available Attendance Forms:
Daily
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours
7. Course administrator's name (mention all, if more than one name)
Name: Assist. Teacher: Rola Fawwaz Hammad Email: rula.f.hammad@tu.edu.iq
8. Course Objectives

Course Objectives	• learning the basics of English language □ studying some tenses □studying some English styles • studying some physical terms
9. Teaching and Learning Strategies	
Strategy	Lecture style, discussing with students, and asking questions to students

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	2	Learn what is the basics of English Language	Basics of English	Lecture	Quiz

Second	2	How and when this tense is used	Present continuous tense	Lecture	Monthly exam
Third	2	Training for reading	Reading	Lecture	Daily listening
Fourth	2	How and when this tense is used	Simple present tense	Lecture	Monthly& daily exam
Fifth	2	How this style is used	Zero conditional (If clause)	Lecture	Monthly& daily exam
Sixth	2	How to use this style	Future passive	Lecture	Monthly& daily exam
Seventh	2	How to use this style	Present passive	Lecture	Monthly& daily exam
Eighth	2		First exam	Lecture	Monthly exam
Ninth	2	Knowing some physical terms	Terms	Lecture	Quiz
Tenth	2	Training for Speaking	Speaking	Lecture	Daily participants
Eleventh	2	Training for reading	Reading	Lecture	Daily participants
Twelfth	2	How to read decimal numbers	Reading decimals	Lecture	Monthly& daily exam
Thirteenth	2	How to read years	Reading years	Lecture	Monthly& daily exam
Fourteenth	2	Knowing the time	Telling the time	Lecture	Monthly& daily exam

Fifteenth	2	How to use this type of Answer	Short Answer	Lecture	Monthly& daily exam
Sixteenth	2	----------	Second exam	Lecture	Monthly exam
Seventeenth	2	Training for writing	Story time	Lecture	Monthly& daily exam
Eighteenth	2	Knowing some definitions	Definitions	Lecture	Monthly& daily exam
Nineteenth	2	How to use this style	Comparative	Lecture	Monthly& daily exam
Twentieth	2	How to use this style	Superlative	Lecture	Monthly& daily exam
Twenty first	2	Training for Reading	Reading	Lecture	Monthly& daily exam
Twenty second	2	----------	Third Exam	Lecture	Monthly exam
Twenty third	2	Knowing the Meaning of some terms	Physical terms	Lecture	Monthly& daily exam
Twenty fourth	2	Reinforcement students' knowledge of vocabulary	Vocabulary	Lecture	Monthly& daily exam
Twenty fifth	2	Reinforcement students' knowledge	Synonyms	Lecture	Monthly& daily exam

Twenty sixth	2	Reinforcement students' knowledge	Antonyms	Lecture	Monthly& daily exam
Twenty seventh	2	Reinforcement students' knowledge	Matching	Lecture	Monthly& daily exam
Twenty eighth	2	Knowing some English styles of communication	Introduction	Lecture	Monthly& daily exam
Twenty ninth	2	----------	Review	Lecture	---------
Thirtieth	2	Students' Evaluation	Fourth Exam	Lecture	Monthly exam

Course description form

1- Course name
Mathematics
2- Course code
MAP031
3- Semester / year
2023-2024
4- Date this description was prepared
15/12/2023
5- Available attendance forms
weekly
6- Number of study hours (total) / number of units (total)
90 hour
7- Name of the course administrator (if more than one name is mentioned)
Name:- Dr. Abbas Kasoob Jarallah , Email:- abbas.g.kasoob@tu.edu.iq
8- Course objectives

Objectives of the study subject	• Providing information to the student about the most important mathematical topics and their relationship to physics.
9- Teaching and learning strategies	
Strategy	Using the face-to-face lecture method and giving students opportunities to discuss and solve daily and monthly questions and tests

10- Course Structure

Week	Hours	Name of the unit or topic	Required learning outcomes	Learning method	Evaluation method
First	**3**	slope	Slope Intercept Form Definition	**Lecture**	Daily and monthly exams, assignments and reporting
Second	**3**	slope	Slope between Two Points	**Lecture**	Daily and monthly exams, assignments and reporting
Third	**3**	slope	Slope of Vertical Lin Slope of parallel lines	**Lecture**	Daily and monthly exams, assignments and reporting
Fourth	**3**	slope	Formula for Distance between Two Points	**Lecture**	Daily and monthly exams, assignments

					and reporting
Fifth	**3**	slope	the angle between two lines	**Lecture**	Daily and monthly exams, assignments and reporting
Sixth	**3**	slope	the angle between two lines	**Lecture**	Daily and monthly exams, assignments and reporting
Seventh	**3**	slope	Examples for the chapter one	**Lecture**	Daily and monthly exams, assignments and reporting
Eighth	**3**	Trigonometric Functions	Trigonometric Functions	**Lecture**	Daily and monthly exams, assignments and reporting
Ninth	**3**	Trigonometric Functions	Trigonometric Functions Values	**Lecture**	Daily and monthly exams, assignments and reporting
Tenth	**3**	Trigonometric Functions	Trigonometric Functions Values	**Lecture**	Daily and monthly exams, assignments and reporting
Eleventh	**3**	Trigonometric Functions	Sum and Difference Identities	**Lecture**	Daily and monthly exams, assignments and reporting
Twelfth	**3**	Trigonometric Functions	Double Angle Identities	**Lecture**	Daily and monthly exams, assignments and reporting
Thirteenth	**3**	Trigonometric Functions	Triple Angle Identities	**Lecture**	Daily and monthly exams, assignments and reporting
Fourteenth	**3**	Trigonometric Functions	Product identities	**Lecture**	Daily and monthly exams, assignments and reporting
Fifteenth	**3**	Trigonometric Functions basics	Examples for the	**Lecture**	Daily and monthly

			chapter		exams, assignments and reporting
Sixteenth	**3**	Chapter 2	Monthly test	**Lecture**	Daily and monthly exams, assignments and reporting
Seventeenth	**3**	The Exponential Function	The Exponential Function	**Lecture**	Daily and monthly exams, assignments and reporting
Eighteenth	**3**	The Exponential Function	Exponent Rules Chart and examples	**Lecture**	Daily and monthly exams, assignments and reporting
Nineteenth	**3**	The logarithmic function	The logarithmic function	**Lecture**	Daily and monthly exams, assignments and reporting
Twentieth	**3**	Example and questions	Examples for the chapter	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-one	**3**	Monthly test	Monthly test	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Two	**3**	Derivatives	Derivatives	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Three	**3**	Derivatives	Differentiation of Trigonometric Functions	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Four	**3**	Derivatives	The Product Rule	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Five	**3**	Derivatives	Examples for the chapter	**Lecture**	Daily and monthly exams, assignments and reporting

Twenty-Six	**3**	Integration	Integration Rule	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Seven	**3**	Integration	double integral	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-eight	**3**	Integration	Triple Integral	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-nine	**3**	Integration	Examples for the chapter	**Lecture**	Daily and monthly exams, assignments and reporting
Thirty	**3**	Integration	Monthly test	**Lecture**	Daily and monthly exams, assignments and reporting

11- Course Evaluation	
core for daily exams: 5, score for assignments and reports: 10, score for monthly exams: 35 Final exam score: 50	
12- learning and Teaching Resources	
Required textbooks (methodology, if any)	Differential and integral calculus N.Piskunov
Main references (sources)	Calculus Basics by Khaled Qasim Samou, Calculus Theory by Freddie
Recommended supporting books and references (scientific journals, reports...)	Nothing
Electronic references, Internet sites	General physics websites, Shum series in mathematics

Course description form

1- Course name
Electricity / n^{2d} stage
2- Course code / ELP 032
3- Semester / year
2023/2024
4- Date this description was prepared
3/9/2023
5- Available attendance forms
Day
6- Number of study hours (total) / number of units (total)
60 hour
7- Name of the course administrator (if more than one name is mentioned)
Name: Prof. dr. : Adnan R. Ahmed , Email:- amazonq797@tu.edu.iq
8- Course objectives

Objectives of the study subject	Electricity & magnetism Force on an charge moving in a magnetic field • Study the conservation and its applications . • Studying of attractive and its Law • Studying Gauss surfaces • Study the columns law . • studying the point charge . • studying the Faraday's law . Bayo s –savert law Application of bayots savert law
9- Teaching and learning strategies	
Strategy	Lecture style, discussing with students, and asking and exchanging questions with students

10- Course Structure

Week	Hours	Name of the unit or topic	Required learning outcomes	Learning method	Evaluation method
First	**2**	**Magnetic field**		**Lecture**	Daily and monthly exams, assignments

					and reporting
Second	**2**	**Magnetic flux**		**Lecture**	Daily and monthly exams, assignments and reporting
Third	**2**	**Force on an charge moving in a magnetic field**		**Lecture**	Daily and monthly exams, assignments and reporting
Fourth	**2**	**First Exam**		**Lecture**	Daily and monthly exams, assignments and reporting
Fifth	**2**	**Movement of an electrically charged particle in a magnetic field**		**Lecture**	Daily and monthly exams, assignments and reporting
Sixth	**2**	**Thomson's experiment to measure the ratio of electron charge to it mass**		**Lecture**	Daily and monthly exams, assignments and reporting
Seventh	**2**	**Hall effect**		**Lecture**	Daily and monthly exams, assignments and reporting
Eighth	**2**	**The force on conductor in which an electric current in a magnetic field**		**Lecture**	Daily and monthly exams, assignments and reporting
Ninth	**2**	**Torque on a coil through which an electric current in a magnetic passes**		**Lecture**	Daily and monthly exams, assignments and reporting
Tenth	**2**	**Second Exam**		**Lecture**	Daily and monthly exams, assignments and reporting
Eleventh	**2**	**Movement coil galvanometer**		**Lecture**	Daily and monthly exams, assignments and reporting
Twelfth	**2**	**Bayo s –savert law Application of**		**Lecture**	Daily and monthly

		bayots savert law Magnetic induction of a moving electric change			exams, assignments and reporting
Thirteenth	**2**	**The force between two long parallel straight wires , each of which is electric current Law of the - amper circle Applications of law of the amper circle**		**Lecture**	Daily and monthly exams, assignments and reporting
Fourteenth	**2**	**third Exam**		**Lecture**	Daily and monthly exams, assignments and reporting
Fifteenth	**2**	**Electric induced force thrust Fara day's law Measure B by using search coil Fara day's disc Electric generator**		**Lecture**	Daily and monthly exams, assignments and reporting
Sixteenth	**2**	**Mutual induction Self-induction Energy stored in the magnetic field Magnetic energy density Linking inductors Electrical transformer**		**Lecture**	Daily and monthly exams, assignments and reporting
Seventeenth	**2**	**The current Power in Ac circuits The effective value of the alternating current and alternating voltage Voltage difference direction chart Resounds**		**Lecture**	Daily and monthly exams, assignments and reporting
Eighteenth	**2**	**Four examination**		**Lecture**	Daily and monthly exams, assignments

					and reporting
Nineteenth	**2**	**Magnetic field**		**Lecture**	Daily and monthly exams, assignments and reporting
Twentieth	**2**	**Magnetic flux**		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-one	**2**	**Force on an charge moving in a magnetic field**		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Two	**2**	**First Exam**		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Three	**2**	**Movement of an electrically charged particle in a magnetic field**		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Four	**2**	**Thomson's experiment to measure the ratio of electron charge to it mass**		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Five	**2**	**Hall effect**		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Six	**2**	**The force on conductor in which an electric current in a magnetic field**		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Seven	**2**	**Torque on a coil through which an electric current in a magnetic passes**		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-eight	**2**	**Second Exam**		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-nine	**2**	**Movement coil galvanometer**		**Lecture**	Daily and monthly

					exams, assignments and reporting
Thirty ١	**2**	**Bayo s –savert law Application of bayots savert law Magnetic induction of a moving electric change**		**Lecture**	Daily and monthly exams, assignments and reporting

11- Course Evaluation

core for daily exams: 5, score for assignments and reports: 10, score for monthly exams: 35 Final exam score: 50

12- learning and Teaching Resources

Required textbooks (methodology, if any)	
Main references (sources)	Electricity and magnetism
Recommended supporting books and references (scientific journals, reports...)	Nothing
Electronic references, Internet sites	

Course description form

1- Course name
Sound and wave motion / Second stage
2- Course code / ATP023
Bachelor's
3- Semester / year
2024/2023
4- Date this description was prepared
2023/9/3
5- Available attendance forms
Day
6- Number of study hours (total) / number of units (total)
60 hour
7- Name of the course administrator (if more than one name is mentioned)
Name:- Prof. Dr:- Nadim Khalid Hassan , Email:- nadimkh4@tu.edu.iq
8- Course objectives

	. Understanding basic concepts in wave motion. **. Studying free Oscillation.** **.Study of superposition of simple harmonic motions.** **.Investigating damped Oscillation.** **.Exploring forced Oscillation.** **.Studying transverse waves in one dimension.** **.Studying longitudinal waves (sound waves).** **.General considerations in sound and wave phenomena.**
9- Teaching and learning strategies	
Strategy	The lecture style, discussing students, asking and circulating questions with students

10- Course Structure

Week	Hours	Name of the unit or topic	Required learning outcomes	Learning method	Evaluation method
First	**2**	**Sound and wave motion**	**Basic concepts**	**Lecture**	Daily and monthly exams,

					assignments and reporting
Second	**2**	**Sound and wave motion**	**Types of Mechanical Wave Motion**	**Lecture**	Daily and monthly exams, assignments and reporting
Third	**2**	**Free Oscillation**	**Equation of Simple Harmonic Motion**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourth	**2**	**Free Oscillation**	**Energy of the Simple Harmonic Oscillator**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifth	**2**	**Free Oscillation**	**Applications of Simple Harmonic Motion**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixth	**2**	**Superposition of Simple Harmonic Motions –**	**Principle of Superposition**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventh	**2**	**Superposition of Simple Harmonic Motions –**	**Superposition Two Simple Harmonic Motions**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighth	**2**	**Superposition of Simple Harmonic Motions –**	**Graphical Method for Superposition Two Perpendicular Simple Harmonic Motions**	**Lecture**	Daily and monthly exams, assignments and reporting
Ninth	**2**	**Damped Oscillation**	**The Force Causing Damped Oscillation**	**Lecture**	Daily and monthly exams, assignments and reporting
Tenth	**2**	**Damped Oscillation**	**Equation of Damped Harmonic Motion**	**Lecture**	Daily and monthly exams, assignments and reporting
Eleventh	**2**	**Damped Oscillation**	**Solution of the Damped**	**Lecture**	Daily and monthly

			Harmonic Motion Equation		exams, assignments and reporting
Twelfth	**2**	**Forced Oscillation**	**Solution of the Forced Motion Equation**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirteenth	**2**	**Forced Oscillation**	**Resonance and Amplitude of Oscillation at Resonance**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourteenth	**2**	**Forced Oscillation**	**The Relationship Between Resonance Frequency and the Natural Frequencies of the Oscillator**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifteenth	**2**	**Transverse Waves in One Dimension**	**Transverse Wave Motion in One Dimension**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixteenth	**2**	**Transverse Waves in One Dimension**	**Equation of Transverse Wave Motion in a Oscillating String**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventeenth	**2**	**Transverse Waves in One Dimension**	**Standing Waves, Free Oscillation of a Stretched and Finite-Length String, and the Sonometer**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighteenth	**2**	**Transverse Waves in One Dimension**	**Laws of Oscillating Strings**	**Lecture**	Daily and monthly exams, assignments and reporting
Nineteenth	**2**	**Longitudinal Waves (Sound Waves)**	**Longitudinal Waves in a Metal Rod and a Column of Fluid**	**Lecture**	Daily and monthly exams, assignments and reporting
Twentieth	**2**	**Longitudinal Waves (Sound Waves)**	**Equation of the Sound Wave in Terms of Pressure**	**Lecture**	Daily and monthly exams, assignments and reporting

Twenty-one	**2**	**Longitudinal Waves (Sound Waves)**	**Standing Longitudinal Waves in Resonance Tubes**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Two	**2**	**Sound and the Wave Phenomenon**	**Pitch, Loudness, Timbre, Pure (or Inaudible) Sounds**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Three	**2**	**Sound and the Wave Phenomenon**	**Decibel Scale, Noise or Disturbance**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Four	**2**	**Sound and the Wave Phenomenon**	**Factors Affecting the Speed of Sound Waves in Air**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Five	**2**	**Sound and the Wave Phenomenon**	**Properties of Sound Waves**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Six	**2**	**Sound and the Wave Phenomenon**	**Doppler Effect**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Seven	**2**	**Ultrasonic Waves and Their Applications**	**Mechanism of Generation of Ultrasonic Waves Components of an Ultrasonic Wave Device**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-eight	**2**	**Ultrasonic Waves and Their Applications**	**Effect of Ultrasonic Waves on Biological Cells**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-nine	**2**	**Ultrasonic Waves and Their Applications**	**Behavior of Ultrasonic Waves in the Human Body**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirty	**2**	**Ultrasonic Waves and Their Applications**	**Some Applications of Ultrasonic Waves**	**Lecture**	Daily and monthly exams, assignments and reporting

11- Course Evaluation	
core for daily exams: 5, score for assignments and reports: 10, score for monthly exams: 35 Final exam score: 50	
12- learning and Teaching Resources	
Required textbooks (methodology, if any)	Sound and Wave Motion Physics Amjad Gorgeah
Main references (sources)	1. Mechanics and Properties of Matter , By: Kohle 2.Acoustics ,Shom Series
Recommended supporting books and references (scientific journals, reports...)	Nothing
Electronic references, Internet sites	General physics websites

Course description form

1- Course name	
Optics / n^{2d} stage	
2- Course code / OPP 012	
3- Semester / year	
2023/2024	
4- Date this description was prepared	
3/9/2023	
5- Available attendance forms	
Day	
6- Number of study hours (total) / number of units (total)	
90 hour	
7- Name of the course administrator (if more than one name is mentioned)	
Name: Prof. dr. : Abdullah M. Ali , Email:- abdullah.ma1763@tu.edu.iq	
8- Course objectives	
Objectives of the study subject	The nature of light & Electromagnetic spectrum • Study the Refraction Reflection phenomena . • Studying the lens & and its laws controlled on that. • Studying the mirrors and its laws controlled on that. • Study the aberration monochromatic , spherical . • studying the diffraction &polarization. • studying the interference .
9- Teaching and learning strategies	
Strategy	Lecture style, discussing with students, and asking and exchanging questions with students

10- Course Structure

Week	Hours	Name of the unit or topic	Required learning outcomes	Learning method	Evaluation method
First	**3**	**THE NATURE AND PROPAGATION OF LIGHT**		**Lecture**	Daily and monthly exams, assignments

		The nature of Light , wave from and rays , Index of refraction , The electromagnetic Spectrum , problems .			and reporting
Second	**3**	**REFLECTION AND REFRACTION** Reflection and refraction at plane surface, the laws of reflection and refraction , Ray treatment of reflection and refraction , the principle of Reversibility, Fermats principle , problems.		**Lecture**	Daily and monthly exams, assignments and reporting
Third	**3**	**SPHERICAL SURFACES** Focal points and Focal lengths, Image formation, Virtual Images, conjugate points and planes, Convention of signs, Graphical constructions , the parallel Ray method, Oblique – Ray methods, Magnification , Reduced vergence, Derivation of Gaussian Formula, problems .		**Lecture**	Daily and monthly exams, assignments and reporting
Fourth	**3**	**First Exam**		**Lecture**	Daily and monthly exams, assignments and reporting
Fifth	**3**	**LENSES** Thin lenses, focal points and focal lengths, Image Formation ,		**Lecture**	Daily and monthly exams, assignments and reporting

		Conjugates points and planes , the parallel –Ray method, The oblique- Ray method Use of lens formula, Lateral Magnifiaction , virtual Images , Lens Markers formula, Thin – Lens combinations, the power of a thin Lens , Derivation of the Lens Makers formula. Thick Lenes, Two spherical surfaces, Focal points and principal points ,Generel thick – Lens Formula			
Sixth	**3**	**SPHERICAL MIRRORS** Focal point and Focal Length, Graphical construction's, Mirror Formulas, power of Mirrors, Thick mirrors, Thick – Mirror Formulas, other thick Mirrors , problems		**Lecture**	Daily and monthly exams, assignments and reporting
Seventh	**3**	**A BERRIONS OF LENSES AND MIRRORS** A berrations , Spherical aberration of a lens , Spherical aberration of Mirrors, coma, Astigmatism ,curvature of field , kinds of aberration .		**Lecture**	Daily and monthly exams, assignments and reporting
Eighth	**3**	**Second Exam**		**Lecture**	Daily and monthly exams, assignments and reporting

Ninth	**3**	OPTICAL INSTRUMENTS The eye , Defects of vision , Spectacle , the simple microscope Magnifier , Refracting telescopes, Normal magnification , the reflecting telescope , camera, stops, the rangefinder, problems.		**Lecture**	Daily and monthly exams, assignments and reporting
Tenth	**3**	**INTERFERENCE** Huygen's principle , Young's Experiment , Interference Fringes from a Double source , Intensity Distribution in the fringe system , , Coherent sources , Division of Amplitude. Fringes of Equal Inclination , Newton's Rings, problems.		**Lecture**	Daily and monthly exams, assignments and reporting
Eleventh	**3**	**DIFFRACTION** Fresnel fraunhofer diffraction , by a single slit, Further		**Lecture**	Daily and monthly exams, assignments and reporting
Twelfth	**3**	Investigation of single – slit		**Lecture**	Daily and monthly exams, assignments and reporting
Thirteenth	**3**	**Third Exam**		**Lecture**	Daily and monthly exams, assignments and reporting
Fourteenth	**3**	Aperture, Resolving power with a Rectangular Aperture, Chromatic		**Lecture**	Daily and monthly exams, assignments and reporting
Fifteenth	**3**	Resolving power of		**Lecture**	Daily and

		a prism,			monthly exams, assignments and reporting
Sixteenth	**3**	Circular Aperture,		**Lecture**	Daily and monthly exams, assignments and reporting
Seventeenth	**3**	Diffraction pattern, Rectangular		**Lecture**	Daily and monthly exams, assignments and reporting
Eighteenth	**3**	Resolving power of a Telescope		**Lecture**	Daily and monthly exams, assignments and reporting
Nineteenth	**3**	, Resoling power of a Microscope,		**Lecture**	Daily and monthly exams, assignments and reporting
Twentieth	**3**	The Double slit, qualitive Aspects of the pattern,		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-one	**3**	Derivation of the Equation for the Intensity,		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Two	**3**	Comparsion of the sigle- slit		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Three	**3**	and Double – slite		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Four	**3**	patterns, Distinction,		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Five	**3**	between Interference and Diffraction		**Lecture**	Daily and monthly exams, assignments

					and reporting
Twenty-Six	**3**	problems.		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Seven	**3**	**POLARIZATION** Polarization by Reflection , Representation of.		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-eight	**3**	the Vibrations in light , polarization Angle and Brewsters law ,		**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-nine	**3**	polarization by a pile of plates, law of Malus, polarization by Dichroic crystals		**Lecture**	Daily and monthly exams, assignments and reporting
Thirty ١	**3**	polarization by Double Refraction, polarization by scattering , problems		**Lecture**	Daily and monthly exams, assignments and reporting

11- Course Evaluation

core for daily exams: 5, score for assignments and reports: 10, score for monthly exams: 35 Final exam score: 50

12- learning and Teaching Resources

Required textbooks (methodology, if any)	Whit ,optics SEARS
Main references (sources)	physical optics
Recommended supporting books and references (scientific journals, reports...)	Nothing
Electronic references, Internet sites	Optics and Photonics (2007) Graham Smith ، Terry A.King

نموذج وصف المقرر

1- course name	
Astronomy- second stage	
2- course code:	
Bachelor's	
3-Semester / year	
2024/2023	
4- Date this description was prepared	
2023/9/3	
5- Available attendance forms	
daily	
6- Number of study hours (total) / number of units (total	
60 hours	
7-Name of the course administrator (if more than one name is mentioned)	
Name: Assist prov.Dr. Kawkab Dawood Salim, e.mail: kawkab_badri@tu.edu.iq	
8- Course objectives	
Objectives of the study subject	**. Learn about astrophysics.** **. Study of the celestial sphere** **. Study of galaxies, their speed and mass** **. Study of stars, their masses, speeds and distances between them** **. Study of planets, dwarf planets and asteroids** **. Study of comets, meteors and meteors.** **. Study of black holes and quasars.** **. Study of dark matter**
9- Teaching and learning strategies	
strategy	**Lecture style, discussing with students, and asking and exchanging questions with students**
Course Structure -10	

week	hours	Name of the unit	Required learning outcomes	Learning method	Evalution method
first	2	Unit one	الفصل الأول Kepler's laws, celestial sphere, astronomical units	lecture	Daily and ا monthly exams, assignments and reporting
second	2	Unit one	Celectial coordinate system	lecture	Daily and monthly exams, assignments and reporting
third	2	Unit two	Physicsl properties of sun and moon	lecture	Daily and monthly exams, assignments Daily and monthly exams, assignments and reporting and reporting
fourth	2	Unit three	physical properties of planets	Lecture	Daily and monthly exams, assignments and reporting
fifth	2	Unit four	optical properties of stars	Lecture	Daily and monthly exams, assignments and reporting
sixth	2	Unit four	R-H diagram of stars and problems	Lecture	Daily and monthly exams, assignments and reporting
seventh	2	Unit four	Types of stars and their life cycle	Lecture	Daily and monthly exams, assignments and reporting
eight		-----	1st exam		الثامن
ninth	2	Unit five	the stars systems	Lecture	Daily and monthly exams, assignments and reporting
tenth	2	Unit five	Calculating the mass of stars in terms of the mass of the sun	Lecture	Daily and monthly exams, assignments and reporting
eleventh	2	Sixth unit	Optical properties of milkt way	Lecture	Daily and monthly exams, assignments and reporting
twelfth	2	Unit seventh	Types of	Lecture	Daily and

			galaxies		**monthly exams, assignments and reporting**
thirteenth	**2**	**Unit seventh**	**effective galaxies types**	**Lecture**	**Daily and monthly exams, assignments and reporting**
fourteenth	**2**	**Unit eighth**	**Quasars, the age of the universe, and the Hubble constant**	**Lecture**	**Daily and monthly exams, assignments and reporting**
fifteenth	**2**	**Unit eighth**	**Theories of the origin of the universe and life in the universe**	**Lecture**	**Daily and monthly exams, assignments and reporting**
sixteenth	**2**	**----**	**Second exam**		

11- Course Evaluation	
core for daily exams: 5, score for assignments and reports: 10, score for monthly exams: 35 Final exam score: 50	
12- learning and Teaching Resources	
Required textbooks (methodology, if any)	Course: The Book of Space, Part Two - Astronomy - Dr. Abdul Hamid Majoul Al-Naimi
Main references (sources) -	- Pathways to Anstronomy Stephen E. Schneider
… Recommended supporting books and references (scientific journals, التقاريرreports...)	
Electronic references, Internet sites	www.nasa.gov

Course Description Template

1. Course Name:
Scientific Research Methods / Second Year

2. Course Code:
Bachelor's Program

3. Annual:
2023/2024

4. Preparation Date of This Description:
27/4/2023

5. Available Attendance Options:
In-person

6. Total Study Hours / Units:
Total Hours: 2
Total Units: 4

7. Course Coordinator(s):
Name: Eng. Ahmed Talab Sabbar
Email: ahmed.s.m.o.j@tu.edu.iq

8. Course Objectives:

- Deepen the undergraduate researcher's knowledge of scientific research steps.
- Introduce the researcher to the concept of research and the scientific method.
- Enable the researcher to define research hypotheses and problems.
- Familiarize the researcher with research classifications based on goals and methods.
- Introduce the researcher to research tools, their role in data collection, and their validity and reliability.

9. Teaching and Learning Strategies:

- Lecture method and student discussions.
- Engaging students with questions and exchanges.

10. Course Structure:

Week	Hours	Learning Outcomes	Unit/Topic Name	Teaching Method	Assessment Method
1	2	Comprehension, Analysis, Synthesis	Origin and Evolution of Science and Research	Lecture, Discussion	Daily and Monthly Exams, Assignments

2	2	Comprehension, Analysis, Synthesis	Scientific Research	Lecture, Discussion	Daily and Monthly Exams, Assignments
3	2	Comprehension, Analysis, Synthesis	Types of Scientific Research	Lecture, Discussion	Daily and Monthly Exams, Assignments
4	2	Comprehension, Analysis, Synthesis	Research Problems, Plans, and Hypotheses	Lecture, Discussion	Daily and Monthly Exams, Assignments
5	2	Comprehension, Analysis, Synthesis	Scientific Research Methods and Tools	Lecture, Discussion	Daily and Monthly Exams, Assignments
6	2	Comprehension, Analysis, Synthesis	Historical Method	Lecture, Discussion	Daily and Monthly Exams, Assignments
7	2	Comprehension, Analysis, Synthesis	Survey Method	Lecture, Discussion	Daily and Monthly Exams, Assignments
8	2	Comprehension, Analysis, Synthesis	Descriptive Method	Lecture, Discussion	Daily and Monthly Exams, Assignments
9	2	Comprehension, Analysis, Synthesis	Comparative Method	Lecture, Discussion	Daily and Monthly Exams, Assignments
10	2	Comprehension, Analysis, Synthesis	Theoretical Mathematical Method	Lecture, Discussion	Daily and Monthly Exams, Assignments
11	2	Comprehension, Analysis, Synthesis	Experimental Method	Lecture, Discussion	Daily and Monthly Exams, Assignments

12	2	Comprehension, Analysis, Synthesis	Key Requirements for Experimental Research	Lecture, Discussion	Daily and Monthly Exams, Assignments
13	2	Comprehension, Analysis, Synthesis	Sources of Information	Lecture, Discussion	Daily and Monthly Exams, Assignments
14	2	Comprehension, Analysis, Synthesis	Databases	Lecture, Discussion	Daily and Monthly Exams, Assignments
15	2	Comprehension, Analysis, Synthesis	Information Networks	Lecture, Discussion	Daily and Monthly Exams, Assignments
16	2	Comprehension, Analysis, Synthesis	Scientific Research Writing	Lecture, Discussion	Daily and Monthly Exams, Assignments
17	2	Comprehension, Analysis, Synthesis	Main Sections of Research	Lecture, Discussion	Daily and Monthly Exams, Assignments
18	2	Comprehension, Analysis, Synthesis	Writing Style and General Format	Lecture, Discussion	Daily and Monthly Exams, Assignments
19	2	Comprehension, Analysis, Synthesis	Rules for Writing Footnotes	Lecture, Discussion	Daily and Monthly Exams, Assignments
20	2	Comprehension, Analysis, Synthesis	Main and Subheadings (Subdivisions)	Lecture, Discussion	Daily and Monthly Exams, Assignments
21	2	Comprehension, Analysis, Synthesis	Referencing by Numbers	Lecture, Discussion	Daily and Monthly Exams, Assignments

22	2	Comprehension, Analysis, Synthesis	Samples	Lecture, Discussion	Daily and Monthly Exams, Assignments
23	2	Comprehension, Analysis, Synthesis	Guidelines for Preparing Tables	Lecture, Discussion	Daily and Monthly Exams, Assignments
24	2	Comprehension, Analysis, Synthesis	Summary or Abstract Section	Lecture, Discussion	Daily and Monthly Exams, Assignments
25	2	Comprehension, Analysis, Synthesis	References or Sources Section	Lecture, Discussion	Daily and Monthly Exams, Assignments
26	2	Comprehension, Analysis, Synthesis	Methods of Citing References	Lecture, Discussion	Daily and Monthly Exams, Assignments
27	2	Comprehension, Analysis, Synthesis	Published Research in Scientific Journals	Lecture, Discussion	Daily and Monthly Exams, Assignments
28	2	Comprehension, Analysis, Synthesis	Card Indexing System	Lecture, Discussion	Daily and Monthly Exams, Assignments
29	2	Comprehension, Analysis, Synthesis	Illustrative Figures in Research	Lecture, Discussion	Daily and Monthly Exams, Assignments
30	2	Comprehension, Analysis, Synthesis	Maps and Other Figures	Lecture, Discussion	Daily and Monthly Exams, Assignments

11. Assessment:

- Monthly Exams: 50%
- Final Exam: 50%

12. Learning and Teaching Resources:

- Required Textbooks:
  Scientific Research Methods: For Primary Levels
- Main References:
  Boyer, Carol, Science (Electronic Scientific Encyclopedia), 1998.
- Additional Suggested Resources:
  None

1. Course Name:
English Language / Second Stage
2. Course Code:
Undergraduate
3. Semester / Year:
2023- 2024
4. Description Preparation Date:
5/ 9/ 2023
5. Available Attendance Forms:
Daily
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours
7. Course administrator's name (mention all, if more than one name)
Name: Assist. Teacher Rola Fawwaz Hammad Email: rula.f.hammad@tu.edu.iq
8. Course Objectives

Course Objectives	• learning the basics of English language □ studying some tenses □studying some English styles for speaking • studying some physical terms
9. Teaching and Learning Strategies	

Strategy	Lecture style, discussing with students, and asking questions to students

10. Course Structure

WW	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	2	Learn what is the basics of English Language	Basics of English	Lecture	Quiz
Second	2	How and when this tense is used	Present simple tense	Lecture	Monthly exam
Third	2	Training for reading	Reading	Lecture	Daily listening
Fourth	2	How and when this tense is used	Future simple tense	Lecture	Monthly& daily exam
Fifth	2	How this style is used	First conditional (If clause)	Lecture	Monthly& daily exam
Sixth	2	How to use this style	Future passive	Lecture	Monthly& daily exam
Seventh	2	How to use this style	Present passive	Lecture	Monthly& daily exam
Eighth	2	Students' Evaluation	First exam	Lecture	Monthly exam
Ninth	2	Knowing some physical terms	Terms	Lecture	Quiz
Tenth	2	Training for Speaking	Speaking	Lecture	Daily participants
Eleventh	2	Training for reading	Reading	Lecture	Daily participants

Twelfth	2	How to read decimal numbers	Reading decimals	Lecture	Monthly& daily exam
Thirteenth	2	How to read years	Reading years	Lecture	Monthly& daily exam
Fourteenth	2	Knowing the time	Telling the time	Lecture	Monthly& daily exam
Fifteenth	2	What is the difference between such styles	So & such	Lecture	Monthly& daily exam
Sixteenth	2	----------	Second exam	Lecture	Monthly exam
Seventeenth	2	Training for writing	Story time	Lecture	Monthly& daily exam
Eighteenth	2	Knowing some definitions	Definitions	Lecture	Monthly& daily exam
Nineteenth	2	How to use this style	Comparative	Lecture	Monthly& daily exam
Twentieth	2	How to use this style	Superlative	Lecture	Monthly& daily exam
Twenty first	2	Knowing such a style in 2nd language	Polite Descripting	Lecture	Monthly& daily exam
Twenty second	2	----------	Third Exam	Lecture	Monthly exam
Twenty third	2	Knowing the Meaning of some terms	Physical terms	Lecture	Monthly& daily exam

Twenty fourth	2	Reinforcement students' knowledge of vocabulary	Vocabulary	Lecture	Monthly& daily exam
Twenty fifth	2	Reinforcement students' knowledge	Synonyms	Lecture	Monthly& daily exam
Twenty sixth	2	Reinforcement students' knowledge	Antonyms	Lecture	Monthly& daily exam
Twenty seventh	2	Reinforcement students' knowledge	Matching	Lecture	Monthly& daily exam
Twenty eighth	2	Identify some linguistic techniques for speaking	Obligation	Lecture	Monthly& daily exam
Twenty ninth	2	----------	Review	Lecture	---------
Thirtieth	2	Students' Evaluation	Fourth Exam	Lecture	Monthly exam

Course description form

1- Course name
Atomic and molecular physics / third stage
2- Course code / ATP023
Bachelor's
3- Semester / year
2024/2023
4- Date this description was prepared
2023/9/3
5- Available attendance forms
Day
6- Number of study hours (total) / number of units (total)
90 hour
7- Name of the course administrator (if more than one name is mentioned)
Name:- Assist. Prof. Dr:- Mohsin Hasan Ali , Email:- muhsin.astro@tu.edu.iq
8- Course objectives

Objectives of the study subject	Identify atomic physics. • Study the theory of relativity. • Study of atomic structure. • Study atomic models • Study the atomic spectra of the hydrogen atom. • X-ray study. Quantum theory of the hydrogen atom.
9- Teaching and learning strategies	
Strategy	Lecture style, discussing with students, and asking and exchanging questions with students

10- Course Structure

Week	Hours	Name of the unit or topic	Required learning outcomes	Learning method	Evaluation method
First	**3**	**Atomic physics**	**Basic concepts**	**Lecture**	Daily and monthly exams, assignments and reporting
Second	**3**	**Relativity theory**	**Basic concepts**	**Lecture**	Daily and monthly exams, assignments

					and reporting
Third	**3**	**Relativity hypotheses**	**Basic concepts**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourth	**3**	**Finding the results of the theory of relativity**	**Finding the results of the theory of relativity**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifth	**3**	**Lorentz transformations**	**Lorentz transformations**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixth	**3**	**Study of atomic structure**	**Study of atomic structure**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventh	**3**	**Atomic models**	**Atomic models**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighth	**3**	**Assumptions of Bohr's model of the hydrogen atom**	**Assumptions of Bohr's model of the hydrogen atom**	**Lecture**	Daily and monthly exams, assignments and reporting
Ninth	**3**	**Assumptions of the Summerfield model of the hydrogen atom**	**Assumptions of the Summerfield model of the hydrogen atom**	**Lecture**	Daily and monthly exams, assignments and reporting
Tenth	**3**	**Know the wave properties of particles**	**the wave properties of particles**	**Lecture**	Daily and monthly exams, assignments and reporting
Eleventh	**3**	**Learn about Herzberg's principle of inaccuracy**	**Learn about Herzberg's principle of inaccuracy**	**Lecture**	Daily and monthly exams, assignments and reporting
Twelfth	**3**	**Knowledge of electron diffraction**	**electron diffraction**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirteenth	**3**	**Knowledge of DeBroglie's principle**	**DeBroglie's principle**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourteenth	**3**	**Learn about Davison's electron diffraction**	**Learn about Davison's electron diffraction**	**Lecture**	Daily and monthly exams, assignments and reporting

		experiment	**experiment**		
Fifteenth	**3**	**Recognize the difference between wave and particle behavior of matter**	**Recognize the difference between wave and particle behavior of matter**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixteenth	**3**	**X-ray identification**	**X-ray identification**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventeenth	**3**	**Knowledge of X-ray spectra**	**X-ray spectra**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighteenth	**3**	**Knowledge of X-ray diffraction**	**X-ray diffraction**	**Lecture**	Daily and monthly exams, assignments and reporting
Nineteenth	**3**	**Knowledge of fluorescent X-rays**	**fluorescent X-rays**	**Lecture**	Daily and monthly exams, assignments and reporting
Twentieth	**3**	**Identify the ways radiation interacts with matter**	**Identify the ways radiation interacts with matter**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-one	**3**	**Learn about the photoelectric effect**	**Learn about the photoelectric effect**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Two	**3**	**Know the Compton effect**	**the Compton effect**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Three	**3**	**Knowledge of the phenomenon of production and annihilation of the pair**	**the phenomenon of production and annihilation of the pair**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Four	**3**	**Knowledge of non-radioactive transitions and the Oker phenomenon**	**non-radioactive transitions and the Oker phenomenon**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Five	**3**	**Knowledge of X-ray**	**X-ray absorption**	**Lecture**	Daily and monthly exams,

		absorption			assignments and reporting
Twenty-Six	**3**	**Knowledge of the quantum theory of the hydrogen atom**	**the quantum theory of the hydrogen atom**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Seven	**3**	**Knowledge of basic quantum numbers**	**basic quantum numbers**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-eight	**3**	**Knowledge of electron configuration and Pauli exclusion principle**	**electron configuration and Pauli exclusion principle**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-nine	**3**	**Learn about molecular physics and molecular bonds**	**molecular physics and molecular bonds**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirty	**3**	**Knowledge of molecular spectra**	**molecular spectra**	**Lecture**	Daily and monthly exams, assignments and reporting

11- Course Evaluation

core for daily exams: 5, score for assignments and reports: 10, score for monthly exams: 35 Final exam score: 50

12- learning and Teaching Resources

Required textbooks (methodology, if any)	Concepts in modern physics
Main references (sources)	Concepts in modern physics / written by Erth Pizer
Recommended supporting books and references (scientific journals, reports...)	Nothing
Electronic references, Internet sites	General physics websites

Course description form

1- Course name
Electronic / third stage
2- Course code /
Bachelor's
3- Semester / year
2024/2023
4- Date this description was prepared
2023/9/3
5- Available attendance forms
Day
6- Number of study hours (total) / number of units (total)
90 hour
7- Name of the course administrator (if more than one name is mentioned)
Name:- Assist. Prof. Dr:- Ibrahim Khalaf Salman , Email:- ibrahim.k.salman@tu.edu.iq

8- Course objectives	
Objectives of the study subject	• Learn about semiconductors. • Study the movement of electrons and electron physics. • Study the physics of semiconductors. • Study the feedback in electronic circuits. • Study logic circuits. • Study integrated circuits. • Nanotechnology
9- Teaching and learning strategies	
Strategy	Lecture style, discussing with students, and asking and exchanging questions with students

10- Course Structure

Week	Hours	Name of the unit or topic	Required learning outcomes	Learning method	Evaluation method
First	**3**	**Introduction to Semiconductors**	**Basic concepts**	**Lecture**	Daily and monthly exams, assignments and reporting
Second	**3**	**Learn about the energy**	**The energy**	**Lecture**	Daily and

		band theory and its effect on materials	**band theory in solids**		monthly exams, assignments and reporting
Third	**3**	**Semiconductor Diode**	**Basic Concepts**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourth	**3**	**Diode characteristics curve, temperature effect, load line and working point**	**Learn how to form a pn junction and the characteristics curve of a diode**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifth	**3**	**Learn about the applications of semiconductor diodes**	**Applications of semiconductor diodes**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixth	**3**	**Learn about Zener Diode and Applications**	**Zener Diode and Applications**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventh	**3**	**Learn about the components of the equivalent circuit, how it works, its applications, and its .effect on temperature**	**The equivalent circuit of a Zener diode and the effect of temperature**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighth	**3**	**Learn about the transistor and how to connect it**	**Bipolar Transistor**	**Lecture**	Daily and monthly exams, assignments and reporting
Ninth	**3**	**Transistor Bias and Transistor Operation Limitations Emitter Bias Circuits**	**Transistor Bias and Load Line and Effect of Temperature on Transistor Operation**	**Lecture**	Daily and monthly exams, assignments and reporting
Tenth	**3**	**Knowing the parameters of transistor operation and the stability of the transistor operation**	**Transistor operation parameters**	**Lecture**	Daily and monthly exams, assignments and reporting
Eleventh	**3**	**Learn about common emitter bias mechanism, connection methods and gain coefficients**	**Common emitter bias circuits**	**Lecture**	Daily and monthly exams, assignments and reporting
Twelfth	**3**	**Understanding**	**Bipolar**	**Lecture**	Daily and

		Bipolar Amplifiers	**Transistor Amplifiers**		monthly exams, assignments and reporting
Thirteenth	**3**	**Transistor Amplifier Working Principle and Equivalent Circuits**	**Transistor and Amplifier Equivalent Circuit**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourteenth	**3**	**Learn how multistage amplifiers work**	**Multistage amplifiers**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifteenth	**3**	**Getting to know thyroesters**	**Thyroidesters**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixteenth	**3**	**Types of thyristors and their applications**	**Thyroidesters**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventeenth	**3**	**Learn about field effect transistors and their types**	**Field Effect Transistors**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighteenth	**3**	**Knowing how to bias field effect transistors and their applications**	**Bias circuits for field effect transistors and their uses**	**Lecture**	Daily and monthly exams, assignments and reporting
Nineteenth	**3**	**Learn about power amplifiers, their types and uses**	**Power amplifiers**	**Lecture**	Daily and monthly exams, assignments and reporting
Twentieth	**3**	**Operational Amplifiers**	**Power Amplifiers**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-one	**3**	**Learn about feedback and its**	**Negative feedback**	**Lecture**	Daily and monthly

		types			exams, assignments and reporting
Twenty-Two	**3**	**Learn about the types of feedback loops and their effects**	**Negative feedback**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Three	**3**	**Positive feedback**	**Positive feedback and oscillators**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Four	**3**	**Understanding Oscillators Oscillation Terms and Types of Oscillators**	**Positive Feedback and Oscillators**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Five	**3**	**Understanding Logic Circuits**	**Logic Circuits**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Six	**3**	**Types of logic gates and their applications**	**Logic gates**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Seven	**3**	**Learn about integrated circuits, their advantages and their manufacture**	**Integrated circuits**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-eight	**3**	**Optical etching and IC component manufacturing**	**Integrated circuits and layer formation**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-nine	**3**	**Basic Concepts of Nanomaterials**	**Nanotechnology**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirty	**3**	**Learn about Nano Carbon and Nanotechnology Applications**	**Carbon Nanotubes and Nano transistors**	**Lecture**	Daily and monthly exams, assignments and reporting

11- Course Evaluation	
core for daily exams: 5, score for assignments and reports: 10, score for monthly exams: 35 Final exam score: 50	
12- learning and Teaching Resources	
Required textbooks (methodology, if any)	Electronics Basics
Main references (sources)	- Basics of Electronics / Written by Prof. Dr. Samir Atta Makki and M.D. Imad Hadi Khalil
Recommended supporting books and references (scientific journals, reports...)	Electron Physics / Written by Dr. Sobhi Saeed Al-Rawi
Electronic references, Internet sites	General physics websites

Course Description Form

1- Course name
Analytical Mechanics / n^{3d} stage
2- Course code / -MAP043
3- Semester / year
2023/2024
4- Date this description was prepared
3/9/2023
5- Available attendance forms
Day
6- Number of study hours (total) / number of units (total)
90 hour
7- Name of the course administrator (if more than one name is mentioned)
Name: Prof. dr. :Niran F. Abduljabar , Email:-   **niran.fadhil64@tu.edu.iq**
8- Course objectives

Objectives of the study subject	• **Introducing students to the basics of analytical mechanics.** • **basic concepts in mechanics, equations of motion.** • **differential and integral calculus of particles.** • **Kepler's laws** • **collisions and their types.** • **Lagrange's equations** • **Hamilton's equations.** • **conservative forces.** • **first and second order**
9- Teaching and learning strategies	
Strategy	**Lecture style, discussing with students, and asking and exchanging questions with students**

10-Course Structure					
The week	**Hours**	**Name of the unit or topic**	**Required learning outcomes**	**Teaching method**	**Evaluation method**
2	6	Definition of basic vector concepts	Definition of basic concepts (vectors)	According to the point8Above or as needed	According to the point8Above or as needed
4	6	Vector calculator and kinematics	Vector calculus and kinematics	According to the point8Above or as needed	According to the point8Above or as needed
6	6	Velocity and acceleration in polar and plane coordinates	Velocity and acceleration in plane polar coordinates	According to the point8Above or as needed	According to the point8Above or as needed
8	6	Velocity and acceleration in cylindrical and spherical	Velocity and acceleration in cylindrical and spherical coordinates	According to the point8Above or as needed	According to the point8Above or as needed
9		First exam	First exam		
10	3	Particle dynamic	particle dynamics	According to the point8Above or as needed	According to the point8Above or as needed
11	3	Movement in a straight line	Motion in a straight line	According to the point8Above or as needed	According to the point8Above or as needed
12	3	Newton's laws of motion	Newton's laws of motion	According to the point8Above or as needed	According to the point8Above or as needed
13		Vector component and unit vector	Vector components and vector unit	According to the point8Above or as needed	According to the point8Above or as needed
13	3	Addition and subtraction of vectors	Properties of vector addition and subtraction	According to the point8Above or as needed	According to the point8Above or as needed
14	3	Mass, force and linear	Mass, Force, and Linear	According to the point8Abo	According to the point8Abo

		momentum	Momentum	ve or as needed	ve or as needed
15	3	Scalar and vector product of two vectors	Scalar and vector product of two vectors	According to the point8Above or as needed	According to the point8Above or as needed
16	3		Second exam		
17		Partial differentiation	Partial derivatives for calculating velocity and acceleration	According to the point8Above or as needed	According to the point8Above or as needed
17	3		Force as a function of position And speed	According to the point8Above or as needed	According to the point8Above or as needed
18	3	The labor base and conservative forces	Employment base and conservative forces	According to the point8Above or as needed	According to the point8Above or as needed
19	3	Potential	Potential energy function and conditions for the existence of the potential function	According to the point8Above or as needed	According to the point8Above or as needed
20	3	Delta effect	Delta effect	According to the point8Above or as needed	According to the point8Above or as needed
21	3		Solve the separation equation	According to the point8Above or as needed	According to the point8Above or as needed
22	3	Center force law of gravity	Central forces, law of gravity, potential energy in a central field	According to the point8Above or as needed	According to the point8Above or as needed
23	3	Center of mass, linear momentum, kinetic energy of a system 0f	Center of mass and linear momentum Kinetic energy of a system of	According to the point8Above or as needed	According to the point8Above or as needed

		particles	particles		
24	3		Third exam		
25	3	Direct and oblique collision	Direct and oblique collisions	According to the point8Above or as needed	According to the point8Above or as needed
26	3	Lacrange and Hamilton equation	Lacrange and Hamilton equations	According to the point8Above or as needed	According to the point8Above or as needed
27	3	Oscillation theory,potential energy	Fluctuation theory, potential energy and equilibrium, stability	According to the point8Above or as needed	According to the point8Above or as needed
	3		Fourth exam		Evaluation method

11-Course Evaluation

1-Updating the curriculum requirements according to what is approved in international universities.
2- Building a computer lab for the purpose of preparing mathematical models to solve complex physical problems.

12-learning and Teaching Resources

Calculus and Analytic geometry by Goerge Thomas 7th edition	1- Required textbooks
Book by Grant R. Fowles Institute of Physics, University of Badji Mokhtar	2- Main references (sources)
	A- Recommended books and references (Scientific journals, reports, ...)
	B - Electronic references, websites...

Course description form

1- Course name	
Thermodynamics/thied stage	
2-Course code	
THP033 Bachelors	
3- Semester /year	
2025-2024	
4-The date this description was prepared	
2024/1/15	
5- Available attendance forms	
Daily	
6- Total number of study hours/ Total number of units	
90 hours	
7- Name of the course administrator	
e-mail safakhalil1989@tu.edu.iq	**Name :Dr safa khalil ibrahem**
8- Course objecttives	
A1- Identifying thermal energy A2- Identifying the laws of heat transfer between substances A3- Identifying the laws of transfer of materials between their four states A4- Knowing and nderstanding the control of pressure and temperature in the states of matter A5- Knowing and understanding the general law of gases A6- Knowing the type of gases and the differences between them And between the ideal gas A7- Identifying the difference in the results of mathematical analysis A8- Understanding the first, second and third laws of thermodynamics	Objectives of the study subject

9- Teaching and learning strategies	
The method of lecturing, discussing with students, and asking and exchanging questions with students	Strategy

10- Course structure

Evaluation method	**Teaching method**	Name of the unit/or topic	hours	week
According to point 8 above and as needed	According to point 8 above and as needed	**Basic concepts in thermodynamics, states of matter, solid state, liquid state, gaseous state, plasma, gas and steam, saturated vapor**	6	2
According to point 8 above and as needed	According to point 8 above and as needed	**Basic curves of evaporation and boiling, Clapyron's equation, solving examples and questions, mathematical theory in thermodynamics, general gas law**	6	4
According to point 8 above and as needed	According to point 8 above and as needed	**state function, compressibility, extensibility, compressibility in an ideal gas, path function, open path, closed path**.	6	6
		First Exam		8
According to point 8 above and as needed	According to point 8 above and as needed	**Work, work done in different processes, work done in an ideal gas, work in Vandel-Wales rates, work done by changing volume, work done by changing pressure,Focal points and principal points ,Generel thick – Lens Formula**	6	6
According to point 8 above and as needed	According to point 8 above and as needed	**Equations of general state of gases, equations of state for ideal gases by theoretical and practical method, Boyle's law, Charles' law, Dalton's law, Joule's law**	3	11
According to point 8 above and as needed	According to point 8 above and as needed	**The general constant of gases, the Vandelois equation, pressure correction, volume correction, finding the values of the critical constants of the Vandelois equation, corresponding cases**	6	13

		Second Exam		15
According to point 8 above and as needed	According to point 8 above and as needed	state modifiers for other entities, state modifiers for an open wire, state modifiers for a paramagnetic material, state modifiers for an electric cell	6	16
According to point 8 above and as needed	According to point 8 above and as needed	The first law of thermodynamics, applications of the first law of thermodynamics, results of the first law, Joule's experiment, enthalpy	6	20
According to point 8 above and as needed	According to point 8 above and as needed	Expansion, free expansion, expansion by suffocation. Joule-Kelvin experiment, derivation of the degree of transformation of gases, the relationship between internal energy and enthalpy.	6	24
According to point 8 above and as needed	According to point 8 above and as needed	**Heat capacity, Rieghard's method for measuring gamma, Carnot cycle, second law of thermodynamics, applications in thermodynamics**	6	28
		Third Exam		29
Evaluation method	**Teaching method**	**Name of the unit/or topic**	**hours**	**week**
According to point 8 above and as needed	According to point 8 above and as needed	**Basic concepts in thermodynamics, states of matter, solid state, liquid state, gaseous state, plasma, gas and steam, saturated vapor**	6	2
According to point 8 above and as needed	According to point 8 above and as needed	**Basic curves of evaporation and boiling, Clapyron's equation, solving examples and questions, mathematical theory in thermodynamics, general gas law**	6	4
According to point 8 above and as needed	According to point 8 above and as needed	**state function, compressibility, extensibility, compressibility in an ideal gas, path function, open path, closed path**.	6	6
		First Exam		8
According to point 8 above and as needed	According to point 8 above and as needed	**Work, work done in different processes, work done in an ideal gas, work in Vandel-Wales rates, work done by changing volume, work done by changing pressure,**Focal points and principal points ,Generel thick – Lens Formula	6	9

According to point 8 above and as needed	According to point 8 above and as needed	**Equations of general state of gases, equations of state for ideal gases by theoretical and practical method, Boyle's law, Charles' law, Dalton's law, Joule's law**	3	11
According to point 8 above and as needed	According to point 8 above and as needed	**The general constant of gases, the Vandelois equation, pressure correction, volume correction, finding the values of the critical constants of the Vandelois equation, corresponding cases**	6	13
According to point 8 above and as needed	According to point 8 above and as needed	**Second Exam**		15
According to point 8 above and as needed	According to point 8 above and as needed	**state modifiers for other entities, state modifiers for an open wire, state modifiers for a paramagnetic material, state modifiers for an electric cell**	6	16
According to point 8 above and as needed	According to point 8 above and as needed	**The first law of thermodynamics, applications of the first law of thermodynamics, results of the first law, Joule's experiment, enthalpy**	6	20
According to point 8 above and as needed	According to point 8 above and as needed	Expansion, free expansion, expansion by suffocation. Joule-Kelvin experiment, derivation of the degree of transformation of gases, the relationship between internal energy and enthalpy.	6	24
According to point 8 above and as needed	According to point 8 above and as needed	**Heat capacity, Rieghard's method for measuring gamma, Carnot cycle, second law of thermodynamics, applications in thermodynamics**	6	28
		Third Exam		29

11-Course evaluation	
Daily exam score: 5, daily exam score: 10, monthly exam score: 35, final exam score: 50	
12- Learing and teaching resources	
FUNDAMENTALS OF thermodynamics	**Required prescribed books (methodology, if any).**
Thermodynamics -	**Main references (sources)**
Thermodynamics and Schaum series	**Recommended supporting books and references (scientific journals, reports)**
General physics websites	**Electronic references, Internet sites**

Course Description Form

1. Course name	
Semiconductors/Third Stage	
2. Course code.	
Bachelor	
3. Chapter/Year	
2024/2023	
4. Date this description was prepared	
2023/9/3	
5. Available attendance forms	
weekly	
6. Number of study hours (total) / Number of units (total)	
60 hours	
7. Name of course administrator (if more than one name is given)	
Lecturer Dr. Rasha Abbas Abdullah	rasha.a.awni@tu.edu.iq
Lecturer Dr. Shahad Ahmed Diab	shahed.ahmed@tu.edu.iq
8. Course objectives	
Subject objectives	**Learn about crystal structures and bonding.** **Learn about crystallography.** **Learn about crystal defects and types of solids in terms of crystallization.** **Learn about the Hall effect.** **Learn about the optical and electrical properties of semiconductors.** **Understand the doping mechanism in semiconductors.** **Learn about the photoelectric properties of semiconductors.** **Understand the p-n junction** **Learn about the energy diagram in semiconductors.**
9. Teaching and learning strategies	
Strategy	**Lecture style, discussing with students, and asking and exchanging questions with students**

10. Course structure					
The week	Watches	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
the first	2	Knowing the types of bonds, the characteristics of each type, and how it is affected	Insistence	The lecture	Daily and monthly exams, assignments and reporting
the second	2	Learn about the crystal structure of materials and how to classify materials according to crystallization.	Crystal structures.	The lecture	Daily and monthly exams, assignments and reporting
the third	2	Identify the types of crystal lattices and crystal systems.	Crystal systems and the Paravisian lattice.	The lecture	Daily and monthly exams, assignments and reporting
Fourth	2	Identify crystal trends, Miller coefficients, and .inverted lattices	Crystalline trends and crystal planes.	The lecture	Daily and monthly exams, assignments and reporting
Fifth	2	Classification of crystalline defects and their details.	Crystalline defects.	The lecture	Daily and monthly exams, assignments and reporting
Sixth	2	Introduction to solid state theory and electron behavior in crystals.	Solid state theory.	The lecture	Daily and monthly exams, assignments and reporting
Seventh	2	Learn the concept of energy packages and study the types .of packages	Energy packs.	The lecture	Daily and monthly exams, assignments and reporting
eighth	2	Understand the relationship between energy and momentum.	Energy and momentum.	The lecture	Daily and monthly exams, assignments and

					reporting
ninth	**2**	**Application of Fermi-Dirac statistics, knowledge of ionization of impurity atoms, phonons, Hall effect.**	**Density of states in energy bands.**	**The lecture**	**Daily and monthly exams, assignments and reporting**
tenth	**2**	**Learn about the optical properties of semiconductors .**	Properties of semiconductors.	**The lecture**	**Daily and monthly exams, assignments and reporting**
eleven	**2**	**Study of different types of electronic transitions.**	Electronic transfers.	**The lecture**	**Daily and monthly exams, assignments and reporting**
Twelve	**2**	**Understand charge generation and combination processes, majority and minority charge carriers, and spontaneous emission.**	Reproductive processes_reunion.	**The lecture**	**Daily and monthly exams, assignments and reporting**
thirteen	**2**	**Understand the mobility of charge carriers, conductivity, resistivity, diffusion and drift of charge carriers.**	Mobility of charge carriers.	**The lecture**	**Daily and monthly exams, assignments and reporting**
Fourteen	**2**	**Understand the p-n junction, depletion region, voltage barrier and study the junction in steady state and biased state.**	p-n junction	**The lecture**	**Daily and monthly exams, assignments and reporting**

11. Course Evaluation	
Daily exams score: 10, Homework and reports score: 10, Monthly exam score: 30 **Final exam score: 50**	
12. Learning and teaching resources	
Required textbooks (methodology if any)	Semiconductor devices.

Main References (Sources)	Solid State Physics Part One Dr. Muayad Gabriel. Introduction to Semiconductor Physics Dr. Yousry Mustafa and Dr. Al-Husseini Taher.
Recommended supporting books and references (scientific journals, reports...)	nothing
Electronic references, websites	General Physics Sites

Course Description

Course Description Template

1. Course Name: Teaching Methods / Third Year

2. Course Code: Bachelor's

3. Year: 2023/2024

4. Date of Preparation: 27/04/2023

5. Available Attendance Formats: In-person

6. Total Study Hours (Overall) / Total Units (Overall): Hours: 2, Units: 4

7. Course Coordinator(s):

Name: Assistant Ahmed Talib Sabar

Email: ahmed.s.m.o.j@tu.edu.iq

Course Objectives

- Understanding different types of curricula.

- Identifying the components of the curriculum.

- Comprehending various teaching methods.

- Understanding daily, term, and annual lesson plans.

Teaching and Learning Strategies

- Strategy: Lecturing to students, engaging in discussions, posing and answering questions.

Course Structure

Week	Hours	Learning Outcomes	Unit/Topic Name	Teaching Method	Assessment Method
1	3	Understand, analyze, synthesize	Concept of Curriculum	Lecturing and guided exploration	Daily and monthly tests, assignments
2	3	Understand, analyze, synthesize	Old Curriculum	Lecturing and guided exploration	Daily and monthly tests, assignments
3	3	Understand, analyze, synthesize	Modern Curriculum	Lecturing and guided exploration	Daily and monthly tests, assignments
4	3	Understand, analyze, synthesize	Foundations of Curriculum Building	Lecturing and guided exploration	Daily and monthly tests, assignments
5	3	Understand, analyze,	Philosophical Foundations	Lecturing and guided	Daily and monthly

		synthesize		exploration	tests, assignments
6	3	Understand, analyze, synthesize	Psychological Foundations	Lecturing and guided exploration	Daily and monthly tests, assignments
7	3	Understand, analyze, synthesize	Methods of Curriculum Organization	Lecturing and guided exploration	Daily and monthly tests, assignments
8	3	Understand, analyze, synthesize	Social Foundations	Lecturing and guided exploration	Daily and monthly tests, assignments
9	3	Understand, analyze, synthesize	Cognitive Foundations	Lecturing and guided exploration	Daily and monthly tests, assignments
10	3	Understand, analyze, synthesize	Curriculum Elements or Components	Lecturing and guided exploration	Daily and monthly tests, assignments
11	3	Understand, analyze, synthesize	Standards and Characteristics of Educational Goals	Lecturing and guided exploration	Daily and monthly tests, assignments
12	3	Understand, analyze, synthesize	Content	Lecturing and guided exploration	Daily and monthly tests, assignments
13	3	Understand, analyze, synthesize	Teaching Methods and Tools	Lecturing and guided exploration	Daily and monthly tests, assignments
14	3	Understand, analyze, synthesize	Evaluation Process	Lecturing and guided exploration	Daily and monthly tests, assignments
15	3	Understand, analyze, synthesize	Textbooks and Curriculum	Lecturing and guided exploration	Daily and monthly tests, assignments
16	3	Understand, analyze, synthesize	Types of School Curricula	Lecturing and guided exploration	Daily and monthly tests, assignments
17	3	Understand, analyze, synthesize	Subject-Centered Curriculum and Broad Fields Curriculum	Lecturing and guided exploration	Daily and monthly tests, assignments
18	3	Understand, analyze,	Activity-Based Curriculum	Lecturing and guided	Daily and monthly

		synthesize	and Core Curriculum	exploration	tests, assignments
19	3	Understand, analyze, synthesize	Units Curriculum	Lecturing and guided exploration	Daily and monthly tests, assignments
20	3	Understand, analyze, synthesize	Teaching as Art and Science	Lecturing and guided exploration	Daily and monthly tests, assignments
21	3	Understand, analyze, synthesize	Teaching Methods	Lecturing and guided exploration	Daily and monthly tests, assignments
22	3	Understand, analyze, synthesize	Types of Teaching Methods	Lecturing and guided exploration	Daily and monthly tests, assignments
23	3	Understand, analyze, synthesize	Specific Teaching Methods	Lecturing and guided exploration	Daily and monthly tests, assignments
24	3	Understand, analyze, synthesize	Group Discussion Method	Lecturing and guided exploration	Daily and monthly tests, assignments
25	3	Understand, analyze, synthesize	Questioning Method	Lecturing and guided exploration	Daily and monthly tests, assignments
26	3	Understand, analyze, synthesize	Problem-Solving Method	Lecturing and guided exploration	Daily and monthly tests, assignments
27	3	Understand, analyze, synthesize	Project-Based Method	Lecturing and guided exploration	Daily and monthly tests, assignments
28	3	Understand, analyze, synthesize	Cooperative Learning	Lecturing and guided exploration	Daily and monthly tests, assignments
29	3	Understand, analyze, synthesize	Programmed Learning	Lecturing and guided exploration	Daily and monthly tests, assignments
30	3	Understand, analyze, synthesize	Computer-Based Learning	Lecturing and guided exploration	Daily and monthly tests, assignments

Course Assessment

- Monthly Exam Scores: 50

- Final Exam Score: 50

Learning and Teaching Resources

- Prescribed Textbooks: Curricula and Teaching Methods for Primary Grades.

- Main References (Sources): None specified.

- Recommended Supporting Books and References (e.g., journals, reports): None specified.

Course description form

1- Course name
Nuclear Physics/ Fourth Stage
2- Course code / ATP023
Bachelor's
3- Semester / year
2024/2023
4- Date this description was prepared
2023/9/3
5- Available attendance forms
Day
6- Number of study hours (total) / number of units (total)
90 hour
7- Name of the course administrator (if more than one name is mentioned)
Name:- Prof. Dr:- Asmaa Ahmed Aziz , Email:- asmaa.jamal@tu.edu.iq
8- Course objectives

Objectives of the study subject	•Basic Concepts of Nuclear Physics •Basic Properties of Nuclei •Dynamic Properties of Nuclei •Nuclear Structure •Shell Model •Shell Model with Spin-Orbit Coupling •Nuclear Interactions • Elementary Particles in Nuclear Physics.
9- Teaching and learning strategies	
Strategy	Lecture style, discussing with students, and asking and exchanging questions with students

10- Course Structure

Week	Hours	Name of the unit or topic	Required learning outcomes	Learning method	Evaluation method
First	**3**	**Basic properties of the nucleus**	**Basic concepts**	**Lecture**	Daily and monthly exams, assignments and reporting
Second	**3**	**The nucleus of the mirror**	**Basic concepts**	**Lecture**	Daily and monthly exams,

					assignments and reporting
Third	**3**	**Some units used in nuclear physics**	**Basic concepts**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourth	**3**	**Atomic mass unit y**	**Atomic mass unit**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifth	**3**	**Constant properties of the nucleus Constant properties of the nucleus**	**Constant properties of the nucleus**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixth	**3**	**Nuclear stability study**	**Nuclear stability study**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventh	**3**	**Kinetic properties of nuclei**	**Kinetic properties of nuclei**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighth	**3**	**radioactivity**	**Assumptions of radioactivity**	**Lecture**	Daily and monthly exams, assignments and reporting
Ninth	**3**	**Assumptions of the Properties of different rays**	**Assumptions of the Properties of different rays**	**Lecture**	Daily and monthly exams, assignments and reporting
Tenth	**3**	**Knowing the nuclear properties of radiation**	**Knowing the nuclear properties of radiation**	**Lecture**	Daily and monthly exams, assignments and reporting
Eleventh	**3**	**nuclear binding energ**	**nuclear binding energy**	**Lecture**	Daily and monthly exams, assignments and reporting
Twelfth	**3**	**Radioactive decay law**	**Radioactive decay law**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirteenth	**3**	**Interaction of**	**Interaction of**	**Lecture**	Daily and

		types of rays with matter	**types of rays with matter**		monthly exams, assignments and reporting
Fourteenth	**3**	**Alpha and beta interactions with matter**	**Alpha and beta interactions with matter**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifteenth	**3**	**Interactions of gamma rays and x-rays with matter tter**	**Interactions of gamma rays and x-rays with matter**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixteenth	**3**	**Types of nuclear detectors**	**Types of nuclear detectors**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventeenth	**3**	**Learn about nuclear reactions**	**Learn about nuclear reactions**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighteenth	**3**	**Nuclear fission and fusion**	**Nuclear fission and fusion**	**Lecture**	Daily and monthly exams, assignments and reporting
Nineteenth	**3**	**Nuclear reactors**	**Nuclear reactors**	**Lecture**	Daily and monthly exams, assignments and reporting
Twentieth	**3**	**Natural radioactive chains**	**Natural radioactive chains**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-one	**3**	**Ionizing and non-ionizing radiation**	**Ionizing and non-ionizing radiation**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Two	**3**	**Nuclear models**	**the Compton effect Nuclear models**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Three	**3**	**Liquid drop model**	**Liquid drop model**	**Lecture**	Daily and monthly exams, assignments

					and reporting
Twenty-Four	**3**	**nuclear shell model**	**nuclear shell model**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Five	**3**	**Learn about uranium**	**Learn about uranium**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Six	**3**	**Enriched and depleted uranium**	**Enriched and depleted uranium**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Seven	**3**	**Nuclear radiation hazards**	**Nuclear radiation hazards**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-eight	**3**	**Basic rules for dealing with radiation**	**Basic rules for dealing with radiation**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-nine	**3**	**Nuclear elementary particles**	**Nuclear elementary particles**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirty	**3**	**Classification of elementary particles**	**Classification of elementary particles**	**Lecture**	Daily and monthly exams, assignments and reporting

11- Course Evaluation	
core for daily exams: 5, score for assignments and reports: 10, score for monthly exams: 35 Final exam score: 50	
12- learning and Teaching Resources	
Required textbooks (methodology, if any)	Concepts in Nuclear physics
Main references (sources)	Concepts in Nuclear physics /
Recommended supporting books and	Nothing

references (scientific journals, reports...)	
Electronic references, Internet sites	General physics websites

1. Course Name:

English Language / 4th Stage

2. Course Code:

Undergraduate

3. Semester / Year:

2023- 2024

4. Description Preparation Date:

5/ 9/ 2023

5. Available Attendance Forms:

Daily

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

60 hours

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

Name: Assist. Teacher:
Rola Fawwaz Hammad
Email:
rula.f.hammad@tu.edu.iq

8. Course Objectives

Course Objectives	• learning the basics of English language □ studying some tenses □studying some English styles for speaking • studying some physical terms

9. Teaching and Learning Strategies

Strategy	Lecture style, discussing with students, and asking questions to students

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	2	Learn what is the basics of English Language	Basics of English	Lecture	Daily test

Second	2	How and when this tense is used	Present perfect simple tense	Lecture	Monthly exam
Third	2	Training for reading	Reading	Lecture	Daily listening
Fourth	2	How and when this tense is used	Present perfect continuous tense	Lecture	Monthly & daily exam
Fifth	2	How this style is used	3rd conditional (If clause)	Lecture	Monthly & daily exam
Sixth	2	How to use this style	Present perfect passive	Lecture	Monthly & daily exam
Seventh	2	How to use this style	Making Requests	Lecture	Monthly & daily exam
Eighth	2	Students' Evaluation	First exam	Lecture	Monthly exam
Ninth	2	Knowing some physical terms	Terms	Lecture	Quiz
Tenth	2	Training for Speaking	Speaking	Lecture	Daily participants
Eleventh	2	Training for reading	Reading	Lecture	Daily participants
Twelfth	2	How to read decimal numbers	Reading decimals	Lecture	Monthly & daily exam
Thirteenth	2	How to read years	Reading years	Lecture	Monthly & daily exam
Fourteenth	2	Knowing the time	Telling the time	Lecture	Monthly & daily exam

Fifteenth	2	What is the difference between adv. & adj.	Adjectives& adverbs	Lecture	Monthly & daily exam
Sixteenth	2	----------	Second exam	Lecture	Monthly exam
Seventeenth	2	Training for writing	Story time	Lecture	Monthly & daily exam
Eighteenth	2	Knowing some definitions	Definitions	Lecture	Monthly & daily exam
Nineteenth	2	How to use this style	Comparative	Lecture	Monthly & daily exam
Twentieth	2	How to use this style	Superlative	Lecture	Monthly & daily exam
Twenty first	2	Knowing such a style in 2^{nd} language	Suggestions	Lecture	Monthly & daily exam
Twenty second	2	Students' Evaluation	Third Exam	Lecture	Monthly exam
Twenty third	2	Knowing the Meaning of some terms	Physical terms	Lecture	Monthly & daily exam
Twenty fourth	2	Reinforcement students' knowledge of vocabulary	Vocabulary	Lecture	Monthly & daily exam
Twenty fifth	2	Reinforcement students' knowledge	Synonyms	Lecture	Monthly & daily exam

Twenty sixth	2	Reinforcement students' knowledge	Antonyms	Lecture	Monthly & daily exam
Twenty seventh	2	Reinforcement students' knowledge	Matching	Lecture	Monthly & daily exam
Twenty eighth	2	Identifhy some English techniques for speaking	Permission	Lecture	Monthly & daily exam
Twenty ninth	2	----------	Review	Lecture	---------
Thirtieth	2	Students' Evaluation	Fourth Exam	Lecture	Monthly exam

Course description form

1- Course name	
Quantum mechanics / fourth stage	
2- Course code / QUP014	
Bachelor's	
4- Semester / year	
2023-2024	
4- Date this description was prepared	
3/9/2023	
5- Available attendance forms	
Day	
6- Number of study hours (total) / number of units (total)	
90 hour	
7- Name of the course administrator (if more than one name is mentioned)	
Name:- Assist. Prof. Dr:- Qahtan Nofan Abdullah , Email:- qahtan.nu@tu.edu.iq	
8- Course objectives	
Objectives of the study subject	• Learn about quantum mechanics. • Study the failures of classical physics in explaining some physical phenomena. • Study the wave function. • Study of operators influences • Study of the time-dependent and time-independent Schrödinger equation • Study the problem of a free particle and a particle confined in a potential well in one, two, and three dimensions • Harmonic oscillator • Study the issue of the hydrogen atom.. • Angular momentum
9- Teaching and learning strategies	
Strategy	Lecture style, discussing with students, and

	asking and exchanging questions with students

10- Course Structure

Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
First	**3**	**Basic concepts**	**Classical physics**	**Lecture**	Daily and monthly exams, assignments and reporting
Second	**3**	**Basic concepts**	**Classical physics**	**Lecture**	Daily and monthly exams, assignments and reporting
Third	**3**	**Basic concepts**	**Classical physics**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourth	**3**	**Learn about quantum mechanics**	**Introduction to quantum mechanics**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifth	**3**	**Learn about quantum mechanics**	**Properties of the wave function s**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixth	**3**	**Learn about quantum mechanics**	**Time-dependent Schrödinger equation**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventh	**3**	**Learn about quantum mechanics**	**Time-Independent Schrödinger equation**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighth	**3**	**Identify the characteristics of operators**	**Substitutive and non-substitutive operators**	**Lecture**	Daily and monthly exams, assignments and reporting
Ninth	**3**		**Expected values**	**Lecture**	Daily and monthly

		Learn about calculating physical observations			exams, assignments and reporting
Tenth	**3**	Learn about calculating physical observations	**Expected values**	**Lecture**	Daily and monthly exams, assignments and reporting
Eleventh	**3**	**Herzberg's principle of inaccuracy**	**Learn about Herzberg's principle of inaccuracy**	**Lecture**	Daily and monthly exams, assignments and reporting
Twelfth	**3**	**The problem of a free particle and a particle trapped in a potential well**	**free particle**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirteenth	**3**	**The problem of a free particle and a particle trapped in a potential well**	**a particle trapped in a potential well in 1-D**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourteenth	**3**	**The problem of a free particle and a particle trapped in a potential well**	**a particle trapped in a potential well in 2-D**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifteenth	**3**	**The problem of a free particle and a particle trapped in a potential well**	**a particle trapped in a potential well in 3-D**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixteenth	**3**	**Examples of a particle**	**Solved Examples**	**Lecture**	Daily and monthly exams, assignments and reporting

		trapped in a potential well			
Seventeenth	**3**	**Simple harmonic oscillator**	**Solution to the quantum harmonic oscillator problem**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighteenth	**3**	**Simple harmonic oscillator**	**Solution to the quantum harmonic oscillator problem**	**Lecture**	Daily and monthly exams, assignments and reporting
Nineteenth	**3**	**Simple harmonic oscillator**	**Energy levels and wave functions of a quantum harmonic oscillator**	**Lecture**	Daily and monthly exams, assignments and reporting
Twentieth	**3**	**Simple harmonic oscillator**	**Energy levels and wave functions of a quantum harmonic oscillator**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-one	**3**	**Simple harmonic oscillator**	**normalization of the wave functions of the harmonic oscillator**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Two	**3**	**Simple harmonic oscillator**	**Solve examples of quantum harmonic oscillator**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Three	**3**	**Hydrogen atom**	**Spherically Symmetrical Potential**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Four	**3**	**Hydrogen atom**	**Solution of the Differential Equations**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Five	**3**	**Hydrogen atom**	Three-variable	**Lecture**	Daily and monthly

			wave function		exams, assignments and reporting
Twenty-Six	**3**	**Hydrogen atom**	**Structure of the hydrogen atom**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Seven	**3**	**Hydrogen atom**	The diagonal function of the hydrogen atom and the overall wave function	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-eight	**3**	**Hydrogen atom**	**electron spin**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-nine	**3**	**Hydrogen atom**	**Knowledge of basic quantum numbers**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirty	**3**	**Hydrogen atom**	**Knowledge of basic quantum numbers**	**Lecture**	Daily and monthly exams, assignments and reporting

11- Course Evaluation

core for daily exams: 5, score for assignments and reports: 10, score for monthly exams: 35 Final exam score: 50

12- learning and Teaching Resources

Required textbooks (methodology, if any)	Introduction to quantum mechanics
Main references (sources)	Concepts in modern physics / written by Erth Pizer
Recommended supporting books and references (scientific journals, reports...)	Nothing
Electronic references, Internet sites	General physics websites

Course description form

1- Course name
Solid State physics / Fourth stage
2- Course code
Bachelor's
3- Semester / year
2024/2023
4- Date this description was prepared
2023/9/3
5- Available attendance forms
Day
6- Number of study hours (total) / number of units (total)
90 hour
7- Name of the course administrator (if more than one name is mentioned)
Name:- Assist. Prof. Dr.Ayed N. Saleh , Email:- ayed.ns@tu.edu.iq
8- Course objectives

Objectives of the study subject	• Identify the nature of matter and the properties of molecules.
9- Teaching and learning strategies	
Strategy	Lecture style, discussing with students, and asking and exchanging questions with students

10- Course Structure

Week	Hours	Name of the unit or topic	Required learning outcomes	Learning method	Evaluation method
First	**3**	**Atomic structure**	**Basic concepts**	**Lecture**	Daily and monthly exams, assignments and reporting
Second	**3**	**periodic table**	**Basic concepts**	**Lecture**	Daily and monthly exams, assignments and reporting
Third	**3**	**Crystallography**	**geometric crystallography**	**Lecture**	Daily and monthly exams,

					assignments and reporting
Fourth	**3**	**Crystallography**	**Physical crystallography**	**Lecture**	Daily and monthly exams, assignments and reporting
Fifth	**3**	**Crystallography**	**Transitional vectors**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixth	**3**	**Crystallography**	**Cell unit**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventh	**3**	**Bonds**	**Material classification**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighth	**3**	**Bonds**	**packing method**	**Lecture**	Daily and monthly exams, assignments and reporting
Ninth	**3**	**Bonds**	**Lattice energy**	**Lecture**	Daily and monthly exams, assignments and reporting
Tenth	**3**	**Bonds**	**Harmonious number**	**Lecture**	Daily and monthly exams, assignments and reporting
Eleventh	**3**	**X-ray diffraction**	**Generation of rays**	**Lecture**	Daily and monthly exams, assignments and reporting
Twelfth	**3**	**X-ray diffraction**	**Filters**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirteenth	**3**	**X-ray diffraction**	**Barak's Law**	**Lecture**	Daily and monthly exams, assignments and reporting
Fourteenth	**3**	**X-ray diffraction**	**Experimental**	**Lecture**	Daily and

			methods		monthly exams, assignments and reporting
Fifteenth	**3**	**X-ray diffraction**	**laue derivation**	**Lecture**	Daily and monthly exams, assignments and reporting
Sixteenth	**3**	**X-ray diffraction**	**Reciprocal lattice**	**Lecture**	Daily and monthly exams, assignments and reporting
Seventeenth	**3**	**X-ray diffraction**	**Engineering construction**	**Lecture**	Daily and monthly exams, assignments and reporting
Eighteenth	**3**	**Crystalline defects**	**Point defects**	**Lecture**	Daily and monthly exams, assignments and reporting
Nineteenth	**3**	**Crystalline defects**	**Lattice defects**	**Lecture**	Daily and monthly exams, assignments and reporting
Twentieth	**3**	**Crystalline defects**	**Diffusion**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-one	**3**	**Crystalline defects**	**Fick's Law**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Two	**3**	**lattice Vibrations**	**Sounic waves**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Three	**3**	**lattice Vibrations**	**atomic vibrations**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Four	**3**	**lattice Vibrations**	**Vibration modes**	**Lecture**	Daily and monthly exams, assignments

					and reporting
Twenty-Five	**3**	**Thermal properties**	**Classical theory**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Six	**3**	**Thermal properties**	**Einstein's theory**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-Seven	**3**	**Electrical properties**	**Classical theory**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-eight	**3**	**Band Throry**	**Pierodic potential**	**Lecture**	Daily and monthly exams, assignments and reporting
Twenty-nine	**3**	**Semiconductor**	**Dopping of semiconductor**	**Lecture**	Daily and monthly exams, assignments and reporting
Thirty ١	**3**	**Superconductivity**	**Superconductivity theory**	**Lecture**	Daily and monthly exams, assignments and reporting

11- Course Evaluation

core for daily exams: 5, score for assignments and reports: 10, score for monthly exams: 35 Final exam score: 50

12- learning and Teaching Resources

Required textbooks (methodology, if any)	Solid State physics
Main references (sources)	Solid State physics / written by Yahaia N. Jamal
Recommended supporting books and references (scientific journals, reports...)	Nothing
Electronic references, Internet sites	General physics websites