QF01/0408-4.0E	Course Plan for Bachelor program - Study Plan Development and Updating Procedures/ physics Department

Study plan No.	2021/2022		**University Specialization**		Bachelor of physics		
Course No.	0150231		**Course name**		Modern Physics		
Credit Hours	3		**Prerequisite/ Co-requisite**		General Physics 2		
Course type	☐ MANDATORY UNIVERSITY REQUIREMENT	☐ UNIVERSITY ELECTIVE REQUIREMENTS	☐ FACULTY MANDATORY REQUIREMENT	☐ Support course family requirements	☐ **Mandatory requirements**	☐ Elective requirements	
Teaching style	☐ **Full online learning**		☐ **Blended learning**		✓ **Traditional learning**		
Teaching model	☐ **1 Synchronous: 1 asynchronous**		☐ **2 face to face : 1 asynchronous**		✓ **2 Traditional**		

Faculty member and study divisions' information (to be filled in each semester by the subject instructor)

Name	Academic rank	Office No.	Phone No.	E-mail	
Dr. Bashar S. Aljawarneh	Assistant Professor	129	429	BasharAljawarneh@gmail.com B. Aljawarneh @zuj.edu.jo	
Division number	**Time**	**Place**	**Number of students**	**Teaching style**	**Approved model**
1	[11:00 - 12:30] M, W	9145	6	**Traditional learning**	2

Brief description

Relativity, particle properties of waves, wave properties of particles, atomic structure quantum mechanics, quantum theory of the hydrogen, atom.

Learning resources

Course book information (Title, author, date of issue, publisher ... etc)	Concepts of Modern Physics,6th edition Author: Arthur Beiser Editor: McGraw-Hill, Inc.			
Supportive learning resources (Books, databases, periodicals, software, applications, others)	Modern Physics and Quantum Mechanics First Edition by Elmer Anderson			
Supporting websites				
The physical environment for teaching	✓ Class room	☐ labs	☐ Virtual educational platform	☐ Others
Necessary equipment and software				
Supporting people with special needs				
For technical support				

Course learning outcomes (S= *Skills, C= Competences K= Knowledge,)*

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No.	Course learning outcomes	The associated program learning output code
	Knowledge	
K1	**Define** the basic of special relativity and elementary quantum mechanics.	MK 1
K2	**Express** the difference between the classical physics and modern physics.	MK 4
K3	**Record** the physical quantity related to the course.	MK 2
	Skills	
S1	**Apply** the basic of special relativity and elementary quantum mechanics in conjunction with elementary mathematical techniques to solve simple problems in relativistic and quantum mechanics	MS 1
S2	**Comprehend** a solution to a physics problem in a clear and logical written form	MS 3
S3	**Drive** physics laws.	MS 3
	Competences	
C1	**Cooperate** to work effectively in the group assignments.	MC 1
C2	**Show** responsibility for self-learning to be aware with recent developments in physics.	MC 4

Mechanisms for direct evaluation of learning outcomes

Type of assessment / learning style	Fully electronic learning	Blended learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
Midterm exam	30%	**30%**	40%	30%
Participation / practical applications	0	**0**	10%	30%
Asynchronous interactive activities	30%	**20%**	0	0
Final exam	40%	**50%**	50%	40%

Schedule of simultaneous / face-to-face encounters and their topics

Week	Subject	learning style*	Reference **
1	Classical Physics Review	Lecture	
2, 3	Special theory of relativity.	Lecture	1-51 Ref 1
3, 4, 5	Particle properties of wave.	Lecture	52 – 91 Ref 1
5	**Review and Mid-Term Exam**	Lecture	690 – 776 Ref 1
5, 6, 7	Wave properties of particles	Lecture	92- 118 Ref 1
8,9	Atomic Structures	Lecture	119 – 159 Ref 1
10, 11, 12	Quantum Mechanics.	Lecture	160-199 Ref 1
13, 14, 15	Quantum Theory of the Hydrogen.	Lecture	200 – 227 Ref 1
16	**Review and Final Exam**		

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Schedule of asynchronous interactive activities (in the case of e-learning and blended learning)

Week	Task / activity	Reference	Expected results
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			