

SYLLABUS

1. Information about the study programme

1.1 Institution of higher education	West University of Timișoara
1.2 Faculty	Physics
1.3 Department of	Physics
1.4 Field of study	Physics
1.5 Study cycle	Master
1.6 Study programme / Qualification	ARMP

2. Information about the subject/discipline

2.1 Name		Complements of Theoretical Physics					
2.2 Course coordinator		Lect.dr. Ion Cotaescu					
2.3 Seminar coordinator		Lect.dr. Ion Cotaescu					
2.4 Year of study	I	2.5 Semester	I	2.6 Type of assessment	Ex	2.7 Type of discipline	DF

3. Total estimated time (hours of teaching per semester)

3.1 Number of hours per week	4	3.2 course	2	3.3 seminars/labs	2
3.4 Total hours in the curriculum	56	3.5 course	28	3.6 seminars/labs	28
Distribution of time:					hours
Study based on Instructions, course materials, bibliography and notes					10
Additional documentation library, specialized electronic platforms / field					4
Training seminars / laboratories, homework, essays, portfolios and essays					5
Tutoring					3
Examinations					2
Other activities					
3.7 Total hours of individual study	20				
3.8 Total hours per semester	80				
3.9 Number of credits	7				

4. Prerequisites (where applicable)

4.1 of curriculum	
4.2 of skills	

5. Conditions (where applicable)

5.1 for the course	
5.2 for the seminar	

6. Discipline objectives – learning outcomes

Knowledge	Knowledge and understanding of discipline-specific phenomena, training and development of theoretical skills to solve specific problems and to interpret correctly and completely the results, practicing teamwork and the ability to organize and investigate, cultivating a scientific environment based on values, ethics professionalism and quality, are just a few arguments that motivate the usefulness of this discipline for the training of a future physicist.
Skills	Training and development of theoretical skills to solve specific problems and to interpret correctly and completely the results.
Responsibility and autonomy	Cultivating a scientific environment based on values, ethics professionalism and quality, are just a few arguments that motivate the usefulness of this discipline for the training of a future physicist

7. Contents

7.1 Course	Teaching methods	Comments
1. Introduction. Development of different branches of physics and the object of study of the course.	Teaching at the blackboard/online google meet and classroom	2ore/1 sapt.
2. Newtonian mechanics. Notions of rigid solid mechanics, moments of inertia, symmetry.	Teaching at the blackboard/online google meet and classroom	4ore/2 sapt.
3. Theoretical mechanics. Lagrange and Hamilton equations, the principle of minimum action, conservation laws.	Teaching at the blackboard/online google meet and classroom	4ore/2 sapt.
4. Quantum mechanics. Schrodinger equation. Principles of quantum mechanics, operators and eigenvalues.	Teaching at the blackboard/online google meet and classroom	4ore/2 sapt.
5. The spine and its own magnetic moment.	Teaching at the blackboard/online google meet and classroom	4ore/2 sapt.
6. Elements of perturbation theory.	Teaching at the blackboard/online google meet and classroom	6ore/3 sapt.
7. Lorentz transformations and special relativity.	Teaching at the blackboard/online google meet and classroom	4ore/2 sapt.
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Bibliography:

1. Serban Titeica, Mecanica Cuantica (Editura Academiei R.S.R. 1984).
2. A. Messiah, Mecanica Cuantica (Editura Stiintifica 1973).
3. I Cotaescu, Curs de mecanica cuantica (Tipografia Universitatii din Timisoara 1990).
4. Arno Bohm, Quantum Mechanics (Springer-Verlag 1994)
5. Viorica Florescu, Tudor Marian, Mircea Zaharia, Probleme de Mecanica Cuantica (Univ. Bucuresti 1986)
6. L. Landau, E.M. Lifsit, Mecanica cuantica. (Editura Tehnica, Bucuresti 1968) .

7.2. Seminar	Teaching methods	Comments
1. Inertial reference systems, Galileo transformations, coordinate systems.	Teaching at the blackboard/online google meet and classroom	2ore/1 sapt.
2. The problem of the two bodies, the movement in the central field, conservation laws.	Teaching at the blackboard/online google meet and classroom	4ore/2 sapt

3. Harmonic oscillator.	Teaching at the blackboard/online google meet and classroom	4ore/2 sapt.
4. Hydrogen atom, quantum numbers.	Teaching at the blackboard/online google meet and classroom	4ore/ 2 sapt.
5. $\frac{1}{2}$ Spin, Schrodinger-Pauli equation.	Teaching at the blackboard/online google meet and classroom	4ore/2 sapt
6. Some calculations of perturbations to simple stationary systems.	Teaching at the blackboard/online google meet and classroom	4ore/2 sapt.
7. Diamagnetism and paramagnetism.	Teaching at the blackboard/online google meet and classroom	2ore/1 sapt
8. Theory of special relativity problems.	Teaching at the blackboard/online google meet and classroom	4ore/2 sapt.

Bibliography:

1. Serban Titeica, Mecanica Cuantica (Editura Academiei R.S.R. 1984).
2. A. Messiah, Mecanica Cuantica (Editura Stiintifica 1973).
3. I Cotaescu, Curs de mecanica cuantica (Tipografia Universitatii din Timisoara 1990).
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6. L. Landau, E.M. Lifsit, Mecanica cuantica. (Editura Tehnica, Bucuresti 1968) .

8. Corroboration of the course contents with the epistemic expectations of the community representative, professional associations and representative employers of the programme itself

Knowledge and understanding of discipline-specific phenomena, training and development of theoretical skills to solve specific problems and to interpret correctly and completely the results, practicing teamwork and the ability to organize and investigate, cultivating a scientific environment based on values, ethics professionalism and quality, are just a few arguments that motivate the usefulness of this discipline for the training of a future physicist.

9. Evaluation

Type of activity	9.1 Evaluation criteria	9.2 Evaluation methods	9.3 Percentage of the final mark
9.4 Course	Ex.	Examen-lucrare scrisa si sustinere de referate	50%
9.5 Seminar	Ex.	Examen-rezolvare de probleme din portofoliul propus	50 %
9.6 Minimum performance standards			
Homework.			

Date of submission:

14.09.2023

Titular of the course:

Lect.dr. Ion Cotaescu

Date of approval in department:

Seminary titular:

Signature:

HEAD OF THE DEPARTMENT: