COURSE CONTENT

1. Information about the program

1.1 Organization	West University of Timisoara
1.2 Faculty	Physics
1.3 Department	Physics
1.4 Field of study	Physics
1.5 Level	Master
1.6 Study program/qualification	**Astrophysics, elementary particles and computational physics**/ according to COR: physicist (211101); teacher (233001); research assistant (248102); analyst (213101);

2. Course information

2.1 Title			**Computational physics**				
2.2 Course instructor			Lect. dr. Alexandra Popescu				
2.3 Laboratory/Seminar instructor			Lect. dr. Alexandra Popescu				
2.4 Year of study	I	2.5 Semester	2	2.6 Type of evaluation	E	2.7 Course type	mandatory

3. Study time distribution (teaching hours per semester)

3.1 No. of hours/week	3	In which: 3.2 curs	1	3.3 seminar/laboratory	2
3.4 Total hours in the educational plan	42	In which: 3.5 curs	14	3.6 seminar/laboratory	28
Time distribution:					hours
Study of lecture notes, bibliography or notes					25
Additional documentation in the library, electronic specialty platforms/ field					20
Seminar / laboratory preparations, homework, portfolio and essays					15
Tutoring					7
Exams					5
Other activities					

3.7 Total hours of individual study	**72**
3.8 Total hours in a semester	**100**
3.9 Number of credits	**4**

4. Prerequisites (if it is the case)

4.1 curriculum	• Algorithms and programming • Introduction in programming • Computational physics (undergraduate study)
4.2 skills	• General skills: the ability to gain general basic knowledge; proper usage of computer science terminology; basic programming skills

5. Requirements (if it is the case)

5.1 for the course	If required, the Google Meet and Google Classroom platforms will be used to hand out the course and laboratory notes.
5.2 de for the seminar/laboratory	

6. Course objectives - expected learning outcomes that contribute to the training and passing of the course

Knowledge	After successful completion of this course students can represent problems of various areas of application simplified, by means of mathematical models, describe and simulate numercially (Excel)
Abilities	The ability to use the Microsoft Excel software to solve numerical problems in the field of physics
Responsibility and autonomy	• Development of a multi- and interdisciplinary way of thinking • Efficient usage of information sources and communication resources both in Romanian and in a foreign language (English)

7. Content

7.1 Course	Teaching methods	Observations
1. Projectile trajectory (1 h)	lecture, conversation, exemplification	Lectures given using Google Meet and lecture notes in electronic format will be shared via Google Classroom.
2. The pursuit problem (1 h)		
3. Equation solving with and without a Solver (8 h)		
4. Fourier Transforms (4 h)		
Bibliography: 1. T. A. Beu, Introduction to numerical programming - A practical guide for Scientists and Engineers using Python and C/C++, CRC Press, Taylor & Francis Group, 2015 2. A.Klein, A. Godunov, Introductory Computational Physics, Cambridge University Press, New York, 2006 3. Bernard V. Liengme - Modelling physics with Microsoft Excel, Morgan and Claypool Publishers 2014		
7.2 Seminar / laboratory	Teaching methods	Observations
Exercises related to the course topics	Individual work under the guidance of the lecturer	Students will solve practical problems with simulations programs under the supervision of the instructor (via Google Meet if necessary)
Bibliography: 1. T. A. Beu, Introduction to numerical programming - A practical guide for Scientists and Engineers using Python and C/C++, CRC Press, Taylor & Francis Group, 2015 2. A.Klein, A. Godunov, Introductory Computational Physics, Cambridge University Press, New York, 2006 3. Bernard V. Liengme - Modelling physics with Microsoft Excel, Morgan and Claypool Publishers 2014		

8. Corroborating the contents of the discipline with the expectations of the representatives of the epistemic community, professional associations and representative employers in the field related to the program

The computation physics course comes as a complement for the theoretical and experimental physics courses offering a future physicist an increased ability to understand the physical phenomena.

9. Evaluation

Activity	9.1 Evaluation criteria	9.2 Evaluation methods	9.3 Percentage of the final mark
9.4 Course	The assimilation level of the gained knowledge	Assessment of the student's activity every week. The final grade depends on the points earned during the semester.	
9.5 Seminar / laboratory	Capacity of solving specific problem		
9.6 Minimum performance standards			
• numerical solution of equations by means of target value search and solver			

Data completării
25.01.2022

Titular de disciplină
Lect. Dr. Alexandra POPESCU
[redacted]

Data avizării în departament

Director de departament
Conf. Dr. Cătălin MARIN
[redacted]