The form of curricula

The basic data	
Academic unit:	**FSHMN**
Name of the subject:	**Experimental Methods in Physics**
Education cycle:	**Master**
Statute of the subject:	**Obligatory**
Study Year:	**1**
Number of hours per week:	**3+2+0**
ECTS - credits:	**8**
Time / location:	**Not known /Amfiteatri i Departamentit te Fizikes**
The instructor:	**Prof.Asst.Dr. Sefer Avdiaj**
Contact details:	**tel: 044 609 918,** **email: sefer.avdiaj@uni-pr.edu.com**
Course description	Measurement and experimentation is the fundaments of the physical sciences. So this course will be focused on the fields such as: preparing and design the experiment, processing of experimental data obtained from experiment, presentation of the data through appropriate distributions and uncertainty evaluation during measurements. The second part of the course will be focused in physics of materials and characterization methods of material using different microscopic techniques such as: SEM, TEM, XPS and Auger.
Goal of the course:	The aim of this is to create idea to the students how to prepare the experiment, which are the main factors which influence the experiment after that the goal of this course is also to introduce to the students the different methods for materials characterization.
Students outcomes:	After completing this course the student could have idea which technique to use for which material etc. After completing the course the student: 1. should have the abilities to propose the adequate methods for particular problems; 2. will be able to prepare the experiment and analyze the data obtained from experiment. 3. will be able to calculate uncertainties in measurements. 4. be able to apply the knowledge obtained to elaborate a work plan in solving a particular problem; be able to explain the data obtained and the phenomena exhibited in the materials analysis

Course structure:(students activities – which corresponds to the results of the students outcomes)			
Activity	**Number of hours /week**	**Day/Weeks**	**Total**
Lectures	3	1/15	45
Numerical exercises/Laboratory exercises	2	1/12	24
Practical work	/	/	6
Contacts with the professor /consultations	1	2/15	30
Tests, Seminar	2	/	4
Homework	/	/	/
Time for self studies (in library or home)	4	5/15	80
Final preparation for exam	/	/	40
The time spent in tests, and final examination	2	/	4
Projects, presentations etc	2	/	4
Total	**18**	**/**	**237**
Methods of teaching and learning:	Lectures, discussions, numerical and practical work, homework, assignments.		
Methods of evaluation :	Final exam, participation in discussion during lectures and seminar presentation, assignments etc.		
Literature			
Basic literature:	1. Philip Bevington and Keith Robinson, Data reduction and error analyses for the physical sciences, McGraw-Hill, New York 2006 2. Yang Leng. Materials Characterization, John Wiley & Sons, Singapore 2013 3. Lecture prepared by lecturer (Dr. Sefer Avdiaj)		
Additional literature:	4. L. Kirkup: Experimental Methods 5. Measurement and Instrumentation Principles, 2001, United Kingdom 6. H.P. Klug. "X-Ray Diffraction Procedures for Polycrystaline and Amorphous Materials", second Edition, John Ëilley & Sons, 1974 7. Frank Settle, Handbook of Instrumental		

	Techniques for Analytical Chemistry, prentice Hall PTR, 1997

The detailed plan of teaching:	
Week	**Lectures**
First week:	*Preparing and perform the experiment. Characteristics of experimental data.*
Second week:	*Physical measuring instruments and their properties (fisrt part)*
Third week:	*Physical measuring instruments and their properties (second part)*
Fourth week:	*Probability distributions. Probability density, the Gaussian distribution and central limit theorem*
Fifth week:	*Uncertainty in measurements*
Sixth week:	*Monte Carlo technique*
Seventh week:	*Least square fits to straight line*
Eighth week:	*Least square fits to a polynomial and any arbitrary function*
Ninth week:	*Fitting composite curves. Testing the fit*
Tenth week:	*Light microscopy*
Eleventh week:	*Transmision electron microscopy (TEM)*
Twelfth week:	*Scanning electron microscopy (SEM)*
Thirteenth week:	*Scanning probe microscopy*
Fourteenth week:	*X-ray spectroscopy for elemental analyses*
Fifteenth week:	*Electron spectroscopy for surface analyses: Auger spectroscopy and XPS*