

MASTER TOPICS: *Chemistry of advanced materials*

SYLLABUS

Course name: Chemical Physics of solid state materials.

Lecturers: assist. prof. dr. Mariana Duca and assist. prof. dr. Bogdan Jurca

Course duration: 28 hours

Laboratory/seminar activity duration: 28 hours

Credits: 5

Evaluation form: examination (50% Physical basis; 50% Chemical applications)

Course

Course number	Topics of the course	Duration (hours)
1.	Crystalline structure	2
2.	Reciprocal lattice. Bragg law. Brillouin zone	3
3.	Fermi gas of electrons in the lattice. Caloric capacity. Conductivity	3
4.	Energy bands. Bloch functions. Kronig-Penney model	3
5.	Diamagnetism and paramagnetism	3
6.	Measurements in magnetic field.	4
7.	Diffraction measurements theory. Techniques. Structural informations.	4
8.	Solid state reactions. Nucleation. Diffusion. Involved mechanisms.	4
9.	Synthesis of solid state materials. Wet chemistry; soft chemistry.	2

Laboratory/Seminar

Lab. number	Topics of the laboratory/seminar activity	Duration (hours)
1.	Laboratory work safety and fire protection Photoresistance and photodiode. Hall effect	4
2.	Ferromagnetic materials. Hysteresis loop	4
3.	Calculation of energy bands	2
4.	Types of paramagnetism. Van Vleck and spin paramagnetism	2
5.	Curie law	2
6.	Symmetry in crystal lattices. Applications	4
7.	Experimental powder diffraction diagrams. Indexation and simulation.	6
8.	Controlled synthesis of an oxide material.	4