Year / Semester	114/2				
Course Name (Chinese)	固態物理(一)				
Course Name (English)	Solid State Physics (I)				
Course Code	2708029	Credit(s)	3	Elective / Compulsory	Elective
Instructor	Name: Yi-Ying Chin ■ Full-Time ☐ Part-Time ☐ Professor ■ Associate Professor ☐ Assistant Professor ☐ Lecturer				
Course Delivery Mode	■ On-Campus ☐ Web-Based ☐ Else				
Course Objectives and Scopes	Having the knowledge about the crystal structures of materials and understanding the underlying mechanisms for their physical properties				
Course Outline	1. Crystal structure: lattice types, basis vectors, unit cells. 2. Crystal diffraction: Bragg condition, reciprocal lattice, Brillouin zones. 3. Crystal binding: cohesive energy, ionic and covalent bonds. 4. Lattice vibrations: acoustic and optic phonons 5. Phonons: quantization, density of states, Bose-Einstein distribution, specific heat. 6. Free-electron gas -- equilibrium: Fermi-Dirac distribution, Fermi-surface, specific heat. 7. Free-electron gas -- transport: resistivity, thermal conductivity, Hall effect. 8. Energy bands: Bloch function, Bloch's Theorem, energy gaps. 9. Magnetism.				
Textbook(s) and References	Textbook: 1. Introduction to Solid State Physics, 8th edition, C. Kittel, John Wiley & Sons (2018). 2. The Oxford Solid State Physics by Steven H. Simon (2017). Reference: 1. Solid State Physics, N. Ashcroft and N. Mermin, Harcourt College Publishers (1976). 2. Solid-State Physics: Introduction to the Theory, James D. Patterson and Bernard C. Bailey (2007). 3. Solid-State Physics: An Introduction to Principles of Materials Science by Harald Ibach and Hans Lüth, Springer (2009). No copyright infringements for textbook(s) and references				
Core Capabilities	☐ Equipped with proficiency in physics ■ Capable of proposing and executing research projects in physics and its related fields ☐ Capable of professional writings on physics ■ Capable of logical reasoning and independent thinking ■ Equipped with the abilities for life-long learning				

Course Overview：
1. Course Materials：■ Handouts ☐ Textbook Supplements
2. Presentations：■ Slides ☐ Blackboard
3. Grading：■ Attendance 10%, ■ Quiz 10%, ☐ Homework 0%, ☐ Programing 0%, ☐ Internship Report 0%, ☐ Project 0%, ■ Midterm Exam 80%, ☐ Final Exam 0%, ■ Final Report 40%, ☐ Else 0%
4. Course Resources：☐ Course Web-Site ■ Electronic Resources ☐ Internship Web-Site
5. Supplementals：
Schedule：
First week: Introduction to solid state physics Second week: Crystal structures Third week and Fourth week: Diffraction method Fifth week and Sixth week: Atomic bonding Seventh week: Lattice vibration Eighth week: Mid-term Exam Ninth week and Tenth week: Photons Eleven week and Twelfth week: Free electron gas Thirteenth and Fourteenth week: Magnetism Fifteenth week: Mid-term Exam Sixteenth and Seventeenth week: Energy bands Eighteenth week: Final report