STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: June - November 2024

Department : PHYSICS

Name/s of the Faculty : Ms. CHRISTY PREETHA. A

Course Title : SOLID STATE PHYSICS

Course Code : 19PH/MC/SS54

Shift : I

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
Jun 19 – 26, 2024 (Day Order 1 - 6)	Introduction to Solid State physicsUnit 1 Crystal Bonding 1.1 Bonding in solids- bond energy, bondlength- types of bonding-Primary bonds	Lecture and problem solving	Solid State Physics by S OPillai Solid State Physics by Ilangovan. K	Quiz, Problem solving in groups
Jun 27 – July 4, 2024 (Day Order 1 - 6)	Ionic bonding - Potential EnergyDiagram of Ionic Molecule Covalent Bond- properties of covalent solids - Metallic bond -properties of Metallic solids	Lecture and problem solving	Solid State Physics by S OPillai Solid State Physics by Ilangovan. K	Quiz
July 5 – 12, 2024 (Day Order 1 - 6)	1.3 Secondary bonds- Van der Waal's bond(molecular bond) – Van der Waal's Bond formation in Helium-properties of Van derWaal bonded solids- hydrogen bonding – hydrogen bond formation inwater-properties of hydrogen bonded solids.	Lecture	Solid State Physics by S OPillai Solid State Physics by Ilangovan. K	Quiz
July 15 – 23, 2024	Unit 2 Defects			

(Day Order 1 - 6)	2.1Classification of Imperfections- Electronic defects – Energy of formation ofa vacancy-Equilibrium concentration of Schottky and Frenkel defects in an ionic crystal	Lecture and problem solving	Solid State Physics by Singhal, R.L.	Questioningon the content taught, Problem solving in groups
July 24 – 31, 2024 (Day Order 1 - 6)	2.2 Line defects – Edge dislocation – Burgervector – Screw Dislocation	Lecture	Solid State Physics by Ilangovan. K	Questioningon the content taught
Aug 1 – 5, 2024 (Day Order 1 - 3)	Unit 3 Electrical properties of solids 3.1 Classical Free electron theory of metals -the free electron gas – Drude Lorentz free electron theory- Ohm's law – expressions for electrical conductivity Thermal conductivity- Wiedemann Franz ratio	Lecture and problem solving	Solid State Physics by S OPillai	Problem solving test
Aug 6 – 10, 2024	**C.A. Test – I**			
Aug 12 – 14, 2024 (Day Order 4-6)	3.2 Hall effect - Hall voltage – Hall coefficient – mobility and Hall angle -Experimental determination of Hall coefficient	Lecture and problem solving	Solid State Physics by Ilangovan. K	Problem solving test
Aug 16 – 23, 2024 (Day Order 1-6)	Unit 4 Magnetic properties of solids 4.1 Different types of magnetic materials - Langevin's theory of diamagnetism - Langevin's theory of paramagnetism - Curie's law-failure of Langevin's theory	Lecture and problem solving	Solid State Physics by Ilangovan. K Fundamentals of Solid State Physics by Saxena, B.S., R.C. Gupta and + P.C. Saxena	Questioning on content taught

Aug 27 – Sep 3, 2024 (Day Order 1-6)	4.1 Weiss theory of paramagnetism-Curie-Weiss law -Ferromagnetism-domain theory of ferromagnetism-Exchange energy-magnetic energy-anisotropic energy-Domain wall energy	Lecture	Solid State Physics by Ilangovan. K	Questioningonthe content taught
Sep 4 – 11, 2024 (Day Order 1-6)	4.2 Hysteresis loop of a ferro magnetic materials-explanation of hysteresis curvewith domain theory - Antiferro and ferromagnetic materials –Applications of ferromagnets	Lecture	Solid State Physics by Singhal, R.L., Solid State Physics by Ilangovan. K	Assignment
Sep 12 - 20, 2024 (Day Order 1- 6)	Unit 5 Superconductors 5.1 Introduction- effect of magnetic field – magnetic properties of superconductors – perfect diamagnetism or the Meissner effect- Type I and type II superconductors-Isotope effect -	Lecture	Introductory Solid State Physics by Charles Kittel Solid State Physics by Ilangovan. K	Quiz
Sep 23 - 26, 2024 (Day Order 1-4)	5.2 Thermodynamic effects - entropy,specific heat, Thermal conductivity - Energy gap - electrodynamics of superconductors - first and second Londonequations-drawbacks of London theory	Lecture	Solid State Physics – K. Ilangovan	Problem solving ingroups, questioningonthe content taught
Sep 27 – Oct 3, 2024	**C.A. Test – II**			
Oct 4 – 5, 2024 (Day 5 & 6)	5.3 – Qualitative explanation of BCS theoryof superconductivity	Lecture	Introductory Solid State Physics by Charles Kittel	Questioningon the content taught
Oct 7 - 15, 2024 (Day Order 1 to 6)	5.3 Applications of superconductors	Power Point presentation	Solid State Physics by	

			Ilangovan. K	Research paper review
Oct 16 - 22, 2024 (Day Order 1 to 6)	5.3 Applications of superconductors (contd)	Power Point presentation	Solid State Physics by Ilangovan. K	Research paper review
Oct 23 - 24, 2024 (Day Order 1 to 2)	**REVISION**			