CBCS Framework, University of Calcutta
Proposed distribution of syllabus and Class load
Course: CEMA, Semester-II
Paper: CEMA-CC-2-4, Inorganic Chemistry

Serial number	Number of lectures	Topic of the prescribed syllabus	Teaching faculty
1.	2	General characteristics, types of ions, size effects, radius ratio rule and its application and limitations. Packing of ions in crystals.	Dr. A. K. Barik
2.	2	Born-Landé equation with Derivation, Madelung constant, and importance of Kapustinskii expression for lattice energy	Dr. A. K. Barik
3.	3	Born-Haber cycle and its application	Dr. A. K. Barik
4.	2	Solvation energy, Solubility energetics of dissolution process	Dr. A. K. Barik
5.	1	Defects in solids (elementary idea).	Dr. A. K. Barik
6.	4	Lewis structures, formal charge. Valence Bond Theory. The hydrogen molecule (Heitler-London approach), directional character of covalent bonds, hybridizations, equivalent and non-equivalent hybrid orbitals, Bent's rule	Dr. A. K. Barik
7.	3	VSEPR theory, shapes of molecules and ions containing lone pairs and bond pairs (examples from main groups chemistry) and multiple bonding (σ and π bond approach).	Dr. A. K. Barik
8.	2	Polarizing power and polarizability, ionic potential, Fazan's rules	Dr. A. K. Barik
9.	1	Dipole moment	Dr. A. K. Barik
10.	5	Hydrogen bonding (theories of hydrogen bonding, valence bond treatment), receptor-guest 3c-4e interactions, Halogen bonds. Effects of chemical force, melting and boiling points.	Dr. J. Gangopadhyay
11.	2	Qualitative idea of valence bond and band theories. Dependence of conductivity on temperature.	Dr. J. Gangopadhyay
12.	3	Semiconductors and insulators, Band gap, Fermi-Dirac distribution of electrons.	Dr. J. Gangopadhyay
13.	4	Molecular orbital concept of bonding (The approximations of the theory, Linear combination of atomic orbitals	Dr. J. Gangopadhyay

		(LCAO)) (elementary pictorial approach): sigma and pi bonds and delta interaction, multiple bonding. Bond properties: bond orders, bond lengths.	
14.	4	Variation principle, energy of orbitals, normalisation, orthogonality, Orbital designations: *gerade*, *ungerade*, HOMO, LUMO. s-p orbital mixing.	Dr. J. Gangopadhyay
15.	5	MO diagrams of H_2, Li_2, Be_2, B_2, C_2, N_2, O_2, F_2, and their ions wherever possible	Dr. J. Gangopadhyay
16.	5	Heteronuclear molecular orbitals: CO, NO, NO^+, CN^-, HF, BeH_2, CO_2 and H_2O.	Dr. J. Gangopadhyay
17.	2	Walsh diagram of AH_2 and AH_3 systems.	Dr. J. Gangopadhyay
18.	3	Nuclear stability and nuclear binding energy. Nuclear forces: meson exchange theory. Nuclear models (elementary idea): Concept of nuclear quantum number, magic numbers.	Dr. J. Chakraborty
19.	4	Nuclear Reactions: Artificial radioactivity, transmutation of elements, fission, fusion and spallation. Nuclear energy and power generation.	Dr. J. Chakraborty
20.	3	Separation and uses of isotopes. Radio chemical methods: principles of determination of age of rocks and minerals, radio carbon dating, hazards of radiation and safety measures	Dr. J. Chakraborty