POST GRADUATE DEPARTMENT

UNIVERSITY OF MUMBAI, FORT CAMPUS

Time Table of Post-Graduate lectures for M.Sc. Part-II Semester-III: Inorganic Chemistry at Zone 1& 2 for the year 2016-2017

(Lectures will commence from 13th June 2017, at WILSON COLLEGE)

PAPER-I			
TO BE ANNOUNCED Friday (2.00-4.00pm)	**Aug-11,18 Sept-1,8,15,22,29 Oct-6.**	**Paper-I : Unit-I Solid State Chemistry-I 15 Lectures**	**Descriptive Crystal Chemistry** **(a) Simple structures** Structures of **AB** type compounds (PbO and CuO), **AB_2** type (β cristobalite, CaC_2 and Cs_2O), **A_2B_3** type (Cr_2O_3 and Bi_2O_3), AB_3 (ReO_3, Li_3N), **ABO_3** type, relation between ReO_3 and perovskite $BaTiO_3$ and its polymorphmic forms, Oxide bronzes, ilmenite structure, **AB_2O_4** type, normal, inverse, and random spinel structures. **(b)Linked Polyhedra** (i) Corner sharing: tetrahedral structure (Silicates) and octahedral structure (ReO_3) and rotation of ReO_3 resulting in VF_3, RhF_3 and calcite type structures. (ii) Edge sharing: tetrahedral structures (SiS_2) and octahedral structures (BiI_3 and $AlCl_3$). pyrochlores, octahedral tunnel structures and lamellar structures
Dr.H.A.Parbat Wilson College Saturday (4.00-6.00pm)	**June-17,24 July- 1,8,15,22,29, Aug.-5**	**Paper-I : Unit-II Solid State Chemistry-I 15 Lectures**	**Imperfection in crystals and Non- Stoichiometry** **(a) Point defects**: Point defects in metals and ionic Crystal – Frenkel defect and Schottky defect. Thermodynamics formation of these defects (mathematical derivation to find defect concentration and numerical problems expected); Defects in non-Stoiochiometric compounds, colour centres. **(b) Line defects**: Edge and Screw Dislocations. Mechanical Properties and Reactivity of Solids. (c) Surface Defects**:** Grain Boundary and Stacking Fault. Dislocation and Grain Boundaries, Vacancies and Interstitial Space in Non-Stoichiometric Crystals, Defect Clusters, Interchangeable Atoms and Extended Atom Defects
Prof. Abhimanyu.K. Yadav Khalsa College Saturday (2.00-4.00pm)	**June-17,24 July- 1,8,15,22,29, Aug.-5**	**Paper-I:Unit-III Solid State Chemistry-I 15 Lectures**	**Inorganic Materials: Properties-I** **(a) Diffusion in Solids**: Fick's Laws of Diffusion (numerical problems expected); Kirkendal Effect; Diffusion and Ionic Conductivity; Applications of Diffusion in Carburizing and non-Carburizing Processes in Steel Making. **(b) Solid state reactions**: General principles and factors influencing reactions of solids, Reactivity of solids. **(c) Liquid Crystals**: Introduction and classification of thermotropic liquid crystals, Polymorphism in liquid crystal, Properties and applications of liquid crystals. **(d) Optical properties:** Colour Centres and Birefringence; Luminescent and Phosphor Materials; Coordinate Model; Phosphor Model; Anti Stokes Phosphor; Ruby Laser; Neodymium Laser.

POST GRADUATE DEPARTMENT

UNIVERSITY OF MUMBAI, FORT CAMPUS

Time Table of Post-Graduate lectures for M.Sc. Part-II Semester-III: Inorganic Chemistry at Zone 1& 2 for the year 2016-2017

(Lectures will commence from 13th June 2017, at WILSON COLLEGE)

Dr.S.Z.Bootwala **Wilson College** **Friday** **(4.00-6.00pm)**	**June-16,23,30** **July-7,14,21,28** **Aug.-4**	**Paper-I:Unit:IV** **Solid State** **Chemistry-I** **15 Lectures**	**Inorganic Materials-I: Preparations** **(a) Methods of Synthesis**: Chemical Method, High Pressure Method, Arc Technique and Skull Method (with examples). **(b) Different methods for single crystal growth:** (i) Crystal Growth from Melt–: Bridgman and Stockbargar, Czochralski and Vernuil methods. (ii) Crystal growth from liquid solution: Flux growth and temperature gradient methods (iii) Crystal growth from vapour phase: – Epitaxial growth methods. **(c) Thin film preparation**: Physical and Chemical methods. **(d) Solid Solutions:** Formation of Substitutional, Interstitial and Complex Solid Solutions; Mechanistic Approach; Study of Solid solutions by X-ray Powder Diffraction and Density Measurement.
PAPER-II			
Dr. S.Z. Bootwala **Wilson College** **Monday** **(2-4 p.m.)**	**June -12,19** **July-** **3,10,17,24,31** **Aug-7**	**Paper-II: Unit-I** **Coordination** **Chemistry** **15 Lectures.**	**Non-Heme Proteins** Coordination geometry of the metal ion and functions. Zn in biological systems: Carbonic anhydrase, protolytic enzymes, e.g. carboxy peptidase, Zinc finger. Role of metal ions in biological electron transfer processes Copper containing proteins and enzymes. Less common ions in biology e.g. Co, Ni, V Metallothionines Biomineralization.
Dr. Bina Arora **M.D.College** **Friday (2-4 p.m.)**	**June-16,23,30** **July-7,14,21,28** **Aug.-4**	**Paper-II: Unit-II** **Coordination** **Chemistry.** **15 Lectures**	**Inorganic Photochemistry and Stability Constants** (a) Inorganic Photochemistry: (i) Luminescence: Fluorescence and Phosphorescence of Transition and Inner Transition Elements. (ii) Prompt and Delayed Reactions (b) Stability Constants: (i) Methods for Determining Stability Constants of Coordination Compounds such as spectrophotometry, Conductometry, Potentiometry, and Polarography (Numerical Problems expected). (ii) Stability Constants of Mixed Ligand Complexes.

POST GRADUATE DEPARTMENT

UNIVERSITY OF MUMBAI, FORT CAMPUS

Time Table of Post-Graduate lectures for M.Sc. Part-II Semester-III: Inorganic Chemistry at Zone 1& 2 for the year 2016-2017

(Lectures will commence from 13th June 2017, at WILSON COLLEGE)

To be announced later **Friday** **(4-6 p.m.)**	**Aug-11,18** **Sept-1,8,15,22,29** **Oct-6.**	**Paper-II: Unit-III** **Coordination Chemistry.** **15 Lectures**	**Reactivity of Chemical Species** Reactivity Matrix of Lewis Acids and Bases (i) Acidity and Basicity Parameters (ii) Measures of hardness and Softness of Acids and Bases; (iii) Pauling and Drago-Wayland Equation (iv) Redox Reactions in Aqueous,Non-Aqueous and Solvent Free Media (v) Latimer Diagrams (vi) Pourbaix Diagrams (vii) Frost diagrams
Dr. S.Z. Bootwala **Wilson College** **Tuesday** **(4-6 p.m.)**	**June: 13,20,27** **July : 4,11,18,25,** **Aug: 1**	**Paper-II: Unit-IV** **Coordination Chemistry.** **15 Lectures**	**Synthesis, Structure and Bonding, and Stereochemistry** **(a) Synthesis of Coordination Compounds** (i) Addition Reactions, (ii) Substitution Reactions, (iii) Redox Reactions, (iv) Thermal Dissociation of Solid Complexes, (v) Reactions in Absence of Oxygen, (vi) Reactions of Coordination Compounds, (vii) Trans Effect **(b) Structure and Bonding** (i) Molecular Orbital Theory for Complexes with Coordination Number 4 and 5 for the central ion (sigma as well as Pi bonding) (ii) Angular Overlap Model **(c) Stereochemistry of Coordination Compounds** (i) Chirality and Fluxionality of Coordination Compounds with Higher Coordination Numbers. (ii) Geometries of Coordination Compounds of d^6 to d^9 metal ions.
PAPER-III			
Dr.H.A.Parbat **Wilson College** **Tuesday** **(2-4 p.m.)**	**June: 13,20,27** **July :** **4,11,18,25,** **Aug: 1**	**Paper-III: Unit-I** **Instrumental Methods of Analysis** **15 Lectures**	**.Diffraction Methods-I** X-Ray Diffraction: Bragg Condition; Miller Indices; Laue Method; Bragg Method; Debye Scherrer Method of X-Ray Structural Analysis of Crystals
Dr. H.A.Parbat **Wilson College** **Monday**	**June -12,19** **July-** **3,10,17,24,31**	**Paper-III: Unit-III** **Instrumental Methods of Analysis**	**Electron Spin Resonance Spectroscopy** (a) Electron behaviour, interaction between electron spin and magnetic field. (b) Instrumentation : Source, Sample cavity. Magnet and Modulation coils, Microwave Bridge,

POST GRADUATE DEPARTMENT

UNIVERSITY OF MUMBAI, FORT CAMPUS

Time Table of Post-Graduate lectures for M.Sc. Part-II Semester-III: Inorganic Chemistry at Zone 1& 2 for the year 2016-2017

(Lectures will commence from 13th June 2017, at WILSON COLLEGE)

(4.00-6.00 p.m.)	**Aug-7**	**15 Lectures**	Sensitivity. (c) Relaxation processes and Line width in ESR transitions: (i) ESR relaxation and chemical bonding. (ii) Interaction between nuclear spin and electron spin (hyperfine coupling) (iii) Spin polarization for atoms and transition metal ions, (iv) Spin-orbit coupling and significance of g-tensors, (v) Application to transition metal complexes (having one unpaired electron) includidng biologic al systems and to inorganic free radicals such as PH_4, F_2 and BH_3
Dr. H.A.Parbat **Wilson College** **Thursday** **(4.00-6.00 p.m.)**	**June-15,22,29** **July-6,13,20,27** **Aug.-3**	**Paper-III: Unit-IV. Instrumental Methods of Analysis** **15 Lectures**	**Mossbauer Spectroscopy** (a) Introduction to Mossbauer Spectroscopy, Mossbauer theory and parameters. (b) Instrumentation: Drive mechanism, sources, detectors, absorber, cosine effect calibration of instrument, conditions for good spectrum. (c) Applications: Purity and characterization, detection of structurally different atoms, in polynuclear compounds, solid state decompositions, study of effect of temperature and pressure on Fe compound, bonding properties and structures.
Dr. H.A.Parbat **Wilson College** **Saturday** **(4.00-6.00pm)**	**Aug-12,19,26** **Sept-9,16,23** **Oct-7,14**	**Paper-III: Unit-II Instrumental Methods of Analysis** **15 Lectures**	**Diffraction Methods-II** (a) Electron Diffraction: Scattering of electrons, Scattering Intensity versus Scattering Angle, Weirl Measurement Technique, Elucidation of Structures of Simple gas Phase Molecules (b) Neutron Diffraction: Scattering of Neutrons: Scattering of neutrons by Solids and Liquids, Magnetic Scattering, Measurement Technique.
PAPER-IV			
Dr. H.A.Parbat **Wilson College** **Thursday** **(2.00-4.00 p.m.)**	**June-15,22,29** **July-6,13,20,27** **Aug.-3**	**Paper-IV:Unit-I Applied Chemistry** **15 Lectures**	**Safety in Chemistry Laboratories** **(a)** Good Laboratory Practices: Elements of Good Laboratory Practices; Standard Operating Procedures; Quality Assurance (b) Handling of Hazardous Materials (i) Toxic Materials (Various types of toxins and their effects on humans) (ii) Explosives and Inflammable Materials

POST GRADUATE DEPARTMENT

UNIVERSITY OF MUMBAI, FORT CAMPUS

Time Table of Post-Graduate lectures for M.Sc. Part-II Semester-III: Inorganic Chemistry at Zone 1& 2 for the year 2016-2017

(Lectures will commence from 13th June 2017, at WILSON COLLEGE)

			(iii) Types of fire extinguishers (iv) Bioactive materials. (c) Recycling and Waste Disposal Management in Chemical Laboratories. (d) Legal provisions regarding Chemical Laboratories. (e) Environment Protection Act, 1986.
Dr. (Mrs.) Chhaya Pawar Acharya Marathe College Wednesday (02-05p.m.) 3L	**Aug- 9,16,23,30 Sept.-6**	**Paper-IV; Unit-II Applied Chemistry 15 Lectures**	**Manufacture and Applications of Inorganic Compounds-I** (i) Lime, Chlorine and Caustic soda, (ii) Ceramics and refractory materials (iii) Cement (iv) Inorganic explosives (mercury fulminate, Lead azide)
Dr. (Mrs.) Chhaya Pawar Acharya Marathe College Wednesday (02-04p.m.)	**June-14,21,29 July-5,12,19,26 August-2**	**Paper-IV;Unit-III Applied Chemistry 15 Lectures**	**Manufacture and Applications of Inorganic Compounds-II** (i) Fertilizers and micronutrients (ii) Glass (iii) Paints and Pigments
Dr.Juleikha Shaikh Maharashtra College Wednesday (4.00-6.00pm)	**June-14,21,29 July-5,12,19,26 August-2**	**PaperIV:Unit:IV. Applied Chemistry 15 Lectures**	**Metallurgy** Occurrence, extraction and metallurgy of Zirconium, Hafnium, Niobium, Tantalum Platinum and Palladium metals. Physical and chemical properties and applications of these metals, compounds of these metals, alloys and their uses.

POST GRADUATE DEPARTMENT

UNIVERSITY OF MUMBAI, FORT CAMPUS

Time Table of Post-Graduate lectures for M.Sc. Part-II Semester-III: Inorganic Chemistry at Zone 1& 2 for the year 2016-2017

(Lectures will commence from 13th June 2017, at WILSON COLLEGE)

M. Sc. Part II (SEM. IV) INORGANIC CHEMISTRY (2017-2018)

NOTE : Attention of post-graduate students M.Sc. Part II (Sem.IV) is invited to the following :-

1. That they will be required to attend in each of the terms, not less than 75% of the total number of lectures delivered & also not less than 75% of the lectures delivered in each paper;

2. In addition to attendance at lectures, they will be required to carry out regular work assigned to them in the form of essays, problems, tutorials, practical etc. as prescribed and shall be required to maintain a record thereof in a properly bound journals. The work carried out by the student shall be reviewed by the respective teachers at the end of two terms. In case, in the opinion of the Head of University Department or the Principals of the recognized Post-graduate Institutions concerned, the candidate has not satisfactorily carried out the assigned work as mentioned above, they may not grant term to the student, even though he/she might have kept the minimum attendance at the lectures.

Sd/-

Mumbai–400 032.
14th Nov., 2017.

Assistant Registrar
UG/PG Section

****

P.S. Teacher participating in the scheme of Post-graduate teaching and Instruction for course in the subject of Chemistry are hereby requested to submit the attendance rolls in respect of the lectures delivered by them during the academic year 2017-2018 within 15 days after completion of their lectures in the respective terms are over to the Superintendent, Post-graduate studies Section, Room No. 130, University of Mumbai, Fort, Mumbai-32.

N.B. Teacher participating in the scheme of post-graduate teaching and Instruction at the M. Sc. degree course in Chemistry are hereby informed that no change will be permitted in the venue and timings of the lectures.

****

POST GRADUATE DEPARTMENT

UNIVERSITY OF MUMBAI, FORT CAMPUS

Time Table of Post-Graduate lectures for M.Sc. Part-II Semester-III: Inorganic Chemistry at Zone 1& 2 for the year 2016-2017

(Lectures will commence from 13th June 2017, at WILSON COLLEGE)

No.PG/ICD/2017-18/ 1362 of 2017. 14th Nov, 2017.

Copy forwarded with compliments to the teachers of the University included in the scheme of post-graduate teaching and instruction at the M. Sc. degree in Chemistry for information and necessary action.

Sd/-

Mumbai–400 032.
14th Nov., 2017.

Assistant Registrar
UG/PG Section