		XeF2 and XeF4). Xenon-oxygen	**UNIT-III** Elementary idea on GC and HPLC.
Jun	Special class,questions -answers discussions and evaluation.	Special class,questions -answers discussions and evaluation.	Special class, questions -answers discussions and evaluation.

Head of the Department,
Department of Chemistry,
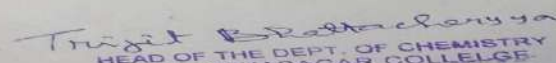Suri Vidyasagar College

SURI VIDYASAGAR COLLEGE
Department of Chemistry
Teaching Plan of *Dr. Sandip Mondal* for the Honours Course (2023-2024)

Month	SEM-I (MAJOR)	SEM-III	SEM-V
Jul	No Inorganic Core Course for SEM-I Honours. No Classes.	Course Code **CC--6** Core Course – VI Nuclear Reactions: Artificial radioactivity, transmutation of elements, fission, fusion and spallation. Nuclear energy and power generation. Separation and uses of isotopes.	Course Code **CC-12** Core Course – XII Coordination Chemistry-II: VB description and its limitations. Elementary Crystal Field Theory: splitting of d^n configurations in octahedral, square planar and tetrahedral fields, crystal field stabilization energy (CFSE) in weak and strong fields; pairing energy. Spectrochemical series. Jahn- Teller distortion. Octahedral site stabilization energy (OSSE).
Aug		Course Code **CC--6** Core Course – VI Radio chemical methods: principles of determination of age of rocks and minerals, radio carbon dating, hazards of radiation and safety measures.	Course Code **CC-12** Core Course – XII Coordination Chemistry-II: Metal-ligand bonding (MO concept, elementary idea), sigma- and pi-bonding in octahedral complexes and their effects on the oxidation states of transitional metals (examples). Magnetism and Colour: Orbital and spin magnetic moments, spin only moments of dn ions and their correlation with effective magnetic moments, including orbital contribution; quenching of magnetic moment: super exchange and antiferromagnetic interactions
Sept		Code **CC--6** Core Course – VI Ionic bond: General characteristics, types of ions, size effects, radius ratio rule and its application and limitations. Packing of ions in crystals. Born-Landé equation with derivation and importance of Kapustinskii expression for lattice energy. Madelung constant.	Course Code **CC-12** Core Course – XII Coordination Chemistry-II: d-d transitions; L-S coupling; qualitative Orgel diagrams for 3d1 to 3d9 ions. Racah parameter. Selection rules for electronic spectral transitions; spectrochemical series of ligands; charge transfer spectra (elementary idea).
Oct		Course Code **CC--6** Core Course – VI Ionic bond: Born-Haber cycle and its application, Solvation energy. Solubility energetics of dissolution process.	Course Code-**DSE-2** Thermal methods of analysis Theory of thermogravimetry (TG), basic principle of instrumentation. Techniques for quantitative estimation of Ca and Mg from their mixture.
Nov		Course Code **CC--6** Core Course – VI Chemical Bonding-II: Molecular orbital concept of bonding (The approximations of the theory, Linear combination of atomic orbitals (LCAO)), sigma and pi-bonds and deltainteraction, multiple bonding.Course	Course Code-**DSE-2** Electroanalytical methods Classification of electroanalytical methods, basic principle of pH metric, potentiometric and conductometric titrations. Techniques used for the determination of equivalence points. Techniques used for the determination of pKa values.
Dec		Course Code **CC--6** Core Course – VI Chemical Bonding-II: Orbital designations:	Course Code-**DSE-2** Development of chromatograms: frontal, elution and displacement methods.

		gerade, ungerade, HOMO, LUMO. Orbital mixing,. MO diagrams of H2, Li2, Be2, B2, C2, N2, O2, F2, and their ions wherever possible; Heteronuclear molecular orbitals: CO, NO, NO+, CN-, HF, BeH2, CO2 and H2O. Bond properties: bond orders, bond lengths.	Qualitative and quantitative aspects of chromatographic methods of analysis: TLC, LC, GLC,and HPLC.
	SEM-II (MAJOR)	**SEM-IV**	**SEM-VI**
Jan	**Basic Chemistry-II (CHEM2011) CHEMICAL BONDING(MODULE-01)** **UNIT-1** Ionic bond: general characteristics, types of ions, size effects, radius ratio rule and its application and limitations, packing of ions in crystals Born-Landé equation with derivation and importance, Kapustinskii expression for lattice energy, Madelung constant, Born-Haber cycle and its application, solvation energy, solubility energetics of dissolution process	Course Code CC--9 Core Course – IX Coordination Chemistry-I : Double and complex salts. Werner's theory of coordination complexes, Classification of ligands, chelates, coordination numbers, IUPAC nomenclature of coordination complexes (up to two metal centers).	Course Code-**CC-13** Core Course – XIII Bioinorganic Chemistry: Elements of life: essential and beneficial elements, major, trace and ultratrace elements. Role of metal ions (specially Na^+, K^+, Mg^{2+}, Ca^{2+}, $Fe^{3+/2+}$, $Cu^{2+/+}$, and Zn^{2+})in biological systems. Metal ion transport across biological membrane Na^+/K^+-ion pump. Oxygen transport in biological systems: Haemoglobin, Myoglobin, Hemocyanine and Hemerythrin. Electron transfer proteins: Cytochromes and Ferredoxins.Course
Feb	**Basic Chemistry-II (CHEM2011) CHEMICAL BONDING(MODULE-01)** **UNIT-II** Covalent bond: polarizing power and polarizability, ionic potential, Fazan's rules,Lewis structures, formal charge, Valence Bond Theory- hydrogen molecule (Heitler-London approach), directional character of covalent bonds, hybridizations, equivalent and non-equivalent hybrid orbitals, Bent's rule, dipole moments, 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)	Course Code **CC--9** Core Course – IX Coordination Chemistry-I : Isomerism in coordination compounds, constitutional and stereo isomerism, Geometrical and optical isomerism in square planar and octahedral complexes.	Course Code-**CC-13** Core Course – XIII Hydrolytic enzymes: carbonate bicarbonate buffering system, carbonic anhydrase and carboxyanhydrase A. Biological nitrogen fixation, Photosynthesis: Photosystem-I and Photosystem-II. Toxic metal ions and their effects, chelation therapy, Pt and Au complexes as drugs (examples only), metal dependent diseases-
Mar	**Basic Chemistry-II (CHEM2011) CHEMICAL BONDING(MODULE-01)** **UNIT-1II** 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)potential at the equivalence point, redox indicators.	Course Code **CC--9** Core Course – IX Inorganic Polymers: Types of inorganic polymers, comparison with organic polymers, synthesis, structural aspects and applications of silicones and siloxanes. Borazines, silicates and phosphazenes.	Course Code-**CC-13** Core Course – XIII Reaction Kinetics and Mechanism Introduction to inorganic reaction mechanisms. Substitution reactions in square planar complexes, Trans- effect and its application in complex synthesis, theories of trans effect, Mechanism of nucleophilic substitution in square planar complexes, Thermodynamic and Kinetic stability, Kinetics of octahedral substitution reactions, Ligand field effects and reaction rates, Mechanism of substitution in octahedral complexes.
Apr	**Basic Chemistry-II (CHEM2011) REDOX REACTIONS AND**	Course Code **CC--9** Core Course – IX	Code-**CC-13** Core Course – XIII

	PRECIPITATION REACTIONS (MODULE-02) **UNIT-1** Balancing of redox reactions: ion-electron method, elementary idea on standard redox potentials- Nernst equation (without derivation), influence of complex formation, precipitation and pH, formal potential	General Principles of Metallurgy:Chief modes of occurrence of metals based on standard electrode potentials. Ellingham diagrams for reduction of metal oxides using carbon and carbon monoxide as reducing agent.	Organometallic Chemistry: Definition and classification of organometallic compounds on the basis of bond type. Concept of hapticity of organic ligands. 18-electron and 16-electron rules. Applications of 18-electron rule to metal carbonyls, nitrosyls, cyanides. General methods of preparation of mono and binuclear carbonyls of 3d series. Structures of mononuclear and binuclear carbonyls. π-acceptor properties of CO, synergic effect and use of IR data to explain extent of back bonding. Zeise's salt: Preparation, structure, evidences of synergic effect.
May	**REDOX REACTIONS AND PRECIPITATION REACTIONS (MODULE-02)** **UNIT-1I** Redox titrations: feasibility, redox potential at the equivalence point, redox indicators, redox potential diagram (Latimer and Frost diagrams) of common elements and their applications Disproportionation and comproportionation reactions (typical examples), solubility product principle, common ion effect and their applications to the precipitation and separation of common metallic ions as hydroxides, sulfides, phosphates, carbonates, sulfates and halides	Course Code **CC--9** Core Course – IX General Principles of Metallurgy*:* Electrolytic Reduction, Hydrometallurgy. Methods of purification of metals: Electrolytic Kroll process, Parting process, van Arkel-de Boer process and Mond's process, Zone refining.	Course Code-**CC-13** Core Course – XIII Organometallic Chemistry: Ferrocene: Preparation and reactions (acetylation, alkylation, metallation, Mannich Condensation). Reactions of organometallic complexes: substitution, oxidative addition, reductive elimination and insertion reactions. Catalysis by Organometallic Compounds: Study of the following industrial processes 1. Alkene hydrogenation (Wilkinson's Catalyst) 2. Hydroformylation 3. Wacker Process 4. Synthetic gasoline (Fischer Tropsch reaction) 5. Ziegler-Natta catalysis for olefin polymerization.
June	Special class, questions -answers discussion and evaluation.	Special class, questions -answers discussion and evaluation.	Special class, questions -answers discussion and evaluation.

Trigit Bhattacharyya
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DEPARTMENT OF CHEMISTRY

TEACHING PLAN OF Mrs. Ishani Sinha
Chemistry (Honours) (2023-24) (July 2023 – June 2024)

Month	Sem-I (H)	No. of Lecture	Sem-III (H)	No. of Lecture	Sem-V (H)	No. of Lecture
Jul	**Theory** Paper code: CHEM1051 Drug discovery, design and development **Practical** Determination of boiling points	4 4	**Theory** **CC7:** Electrophilic aromatic substitution **Practical** **CC7:** *Qualitative Analysis of Single Solid Organic Compounds part 1* **Theory** **SEC1:**	8 2	**Theory** **CC12:** Polynuclear hydrocarbons and their derivatives **Practical** **CC12:** TLC separation of a mixture containing 2/3 amino acids 2. TLC separation of a mixture of dyes (fluorescein and methylene blue)	6 2
Aug	**Theory** Paper code: CHEM1051 synthesis of the representative drugs of the following classes: analgesics agents, antipyretic agents, anti-inflammatory agents (aspirin, paracetamol, ilbuprofen), **Practical** **CC1: Identification of single compound**	4 2	**Theory** **CC7:** Nucleophilic aromatic substitution **Practical** **CC:** *Qualitative Analysis of Single Solid Organic Compounds Part 2*	4 2	**Theory** **CC12:** Carbohydrates **Practical** **CC12:** Paper chromatographic separation of a mixture containing 2/3 amino acids	6 4
Sept	**Theory** Paper code: CHEM1051 antibiotics (penicillin, chloramphenicol), **Practical** **CC1: Identification of single compound**	4 2	**Theory** **CC7:** *Organometallics* **Practical** **CC7:** Melting point of the given compound Preparation of one derivative of the given sample Part1 ,	8 2	.**Theory** **CC12:** Biomolecules: amino acids and peptides **Practical** **CC12:** Column chromatographic separation of mixture of dyes	8 2
Oct	**Theory** Paper code: CHEM1051 antibacterial and antifungal agents	4	**Theory** **CC7:** Nucleophilic addition to α,β-unsaturated carbonyl system	8	**Theory** **CC12:** Biomolecules: Nucleic acids **Practical** **CC12:**	8 2

Month						
	(sulphonamides, sulphanethoxazol,) **Practical CC1: identification of single compound (liquid)**	2	**Practical CC7:** Preparation of one derivative of the given sample Part 2	2	Spectroscopic Analysis of Organic Compounds:Part1	
Nov	**Theory** Paper code: CHEM1051 Revision **Practical CC1: Practical Revision**	4 2	**Theory CC7:** Nucleophilic addition to α,β-unsaturated carbonyl system **Practical CC7: Detection of unknown organi sample** .	7 2	**Theory CC12:** Alkaloids and Terpenoids part I **Practical CC12:** Spectroscopic Analysis of Organic Compounds: Part 2	4 2
Dec	**Theory** Paper code: CHEM1051 Revision Special classes + doubt clearing+ discussions **Practical CC1: Organic Chemistry** Practice classes	4 2	**Theory CC6:** *Organometallics* **Practical CC7: Revision**	3 1	**Theory CC12:** Alkaloids and Terpenoids part II **Practical CC12: Revision**	4 1
	Sem-II (H)		**Sem-IV (H)**		**Sem-VI (H)**	
Jan			**Theory CC10** *Nitrogen compounds* **Practical CC10** Estimation of vitamin-C (reduced) SEC-2 *Drugs & Pharmaceuticals Part 1* .	4 2 2	**Theory DSE-3:** Designing greener processes **Practical DSE-3:** Benzoin condensation using Thiamine Hydrochloride as a catalyst	2 2

Feb			**Theory** **CC10:** Rearrangement to electron-deficient carbon and oxygen **Practical CC10:** Estimation of phenol by bromination (Bromate-Bromide) method SEC-2 *Drugs & Pharmaceuticals Part 2*	5 2 4	**Theory** **DSE-3:**Use of microwaves and ultrasonic energy in green processes. **Practical DSE-3:** Photoreduction of benzophenone to benzopinacol in the presence of sunlight.	2 2
Mar			**Theory** **CC10:** Aromatic rearrangements **Practical** **CC10:** Estimation of acetic acid in commercial vinegar SEC-2 *Fermentation Part 1*	5 2 3	**Theory** **DSE-3:** Selection of starting materials, Preferential use of catalytic reagents **Practical** **DSE-3:** Preparation of propene by two methods can be studied, Other types of reactions, like addition, elimination, substitution and rearrangement should also be studied for the calculation of atom economy. .	3 2
Apr			**Theory** **CC10:** Migration from nitrogen to ring carbon, Rearrangement reactions by green approach **Practical**	4	**Theory** **DSE-3:** Development of green analytical techniques, Green synthesis of adipic acid	3

			CC10 . Estimation of saponification value of oil/fat/ester	4	Practical DSE-3: Revision .	1
			SEC-2 *Fermentation Part 2*	3		
May			Theory CC10: *Organic Spectroscopy: UV spectra* Practical CC10: Revision	4 2	Theory DSE-3: Application of surfactant absorbed carbon dioxide for dry cleaning Practical DSE-3: Revision	3 2
June			Theory CC10: Asymmetric synthesis and **Doubt clearing** Practical CC10: Practical Revision	2 1	Theory CC14: An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn Practical DSE-3: Revision	3 2

Head of the Department,
Department of Chemistry,

DEPARTMENT OF CHEMISTRY

TEACHING PLAN OF SOURAV KUMAR DAS
Chemistry (Honours) (2023-24) (July 2023 – June 2024)

Month	Sem-I (H)	No. of Lectures	Sem-III (H)	No. of Lectures	Sem-V (H)	No. of Lectures	
Jul	**Theory: Paper code: CHEM1051** Drug discovery, design and development,	4	**Theory CC5** Partial properties and Chemical potential: Chemical potential and activity, partial molar quantities **Practical Course Code: CC-5** Study of viscosity of unknown liquid (glycerol, sugar) with respect to water	6 4	**Theory DSE1:** Types of solid, Laws of crystallography (Haüy's law and Steno's law) **Practical, Course Code: CC-12** Assignment of labelled peaks in the 1H NMR spectra of the known organic compounds explaining the relative δ-values and splitting pattern	4 4	
Aug	**Theory: Paper code: CHEM1051** synthesis of the representative drugs of the following classes: analgesics agents, antipyretic agents, anti-inflammatory agents	8	**Theory CC5:** relation between Chemical potential and Gibb's free energy and other thermodynamic state functions; variation of Chemical potential (μ) with temperature and pressure; Gibbs-Duhem equation; fugacity and fugacity coefficient **Practical Course Code: CC-5** Determination of partition coefficient for the distribution of I2 between water and CCl4. .	8 4	**Theory DSE1:**. Crystal planes: **Practical, Course Code: CC-12** Assignment of labelled peaks in the IR spectrum of the same compound explaining the relative frequencies of the absorptions (C-H, O-H, N-H, C-O, C-N, C-X, C=C, C=O, N=O, C≡C, C≡N stretching frequencies; characteristic bending vibrations are included).	4	
Sept	**Theory:** Paper code: CHEM1051 synthesis of antiviral agents (acyclovir), central nervous system agents	8	**Theory: CC5:** Variation of thermodynamic functions for systems with variable composition; Equations of states for these	8	.**Theory: DSE -1:** Powder method; Structure of NaCl and KCl crystals **Practical, Course Code: CC-12** full spectral analysis	4	

	(phenobarbital, diazepam),		systems, Change in G, S, H and V during mixing for binary solutions. **Practical Course Code: CC-5** Determination of Keq for KI + I2 □ KI3, using partition coefficient between water and CCl4.	4		
Oct	**Theory: Paper code: CHEM1051** cardiovascular (glyceryl trinitrate), antilaprosy (dapsone	6	**Theory :** **CC5:** Chemical Equilibrium: Thermodynamic conditions for equilibrium, degree of advancement; van't Hoff's reaction isotherm (deduction from chemical potential); Variation of free energy with degree of advancement; Equilibrium constant and standard Gibbs free energy change **Practical Course Code: CC-5** Conductometric titration of an acid against strong base**.**	8 4	**Theory :** **DSE1:** Polymers **Practical, Course Code: CC-12** full spectral analysis	4
Nov	**Theory: Paper code: CHEM1051** HIV-AIDS related drugs (AZT-Zidovudine)	6	**Theory :** **CC5:** Definitions of KP, KC and KX; van't Hoff's reaction isobar and isochore; Shifting of equilibrium ; variation of equilibrium constant with addition to inert gas; Le Chatelier's principle and its derivation. **Practical Course Code: CC-5** Verification of Ostwald'sdilution law and determination of Ka of weak acid.	8 4	**Theory:** **DSE1:** Dipole moment and polarizability: **Practical, Course Code: CC-12** full spectral analysis	4
Dec	**Theory:** **Paper code:** **CHEM1051**	4	**CC5:** Special classes + doubt clearing+ discussions	6	**Theory :** **DSE1:** Special classes. **Practical, Course**	4

	Special classes + doubt clearing+ discussions				Code: CC-12 revision	4
	Sem-II (H)		**Sem-IV (H)**		**Sem-VI (H)**	
Jan	**Theory , SEC** Chromatography	8	**Theory :** **CC8:** Ionic equilibria: Chemical potential of an ion in solution **Practical : CC-8** Determination of solubility of sparingly soluble salt in water, in electrolyte with common ions and in neutral electrolyte	6 4	*Theory :* *CC14:* Molecular Spectroscopy 1. Interaction of electromagnetic radiation with molecules and various types of spectra; Born-Oppenheimer approximation **Practical : CC-14** Determination of surface tension of a liquid using Stalagmometer.	4 4
Feb	**Theory , SEC** determination of ion exchange capacity of anion /cation exchange resin	6	**Theory :** **CC8:** Debye-Hückel limiting law-brief qualitative description of the postulates involved, qualitative idea of the model, the equation ,solubility of sparingly soluble salt in water. **Practical : CC-8**	8	**Theory :** **CC14:** Rotation spectroscopy, Vibrational spectroscopy **Practical : CC-14** Determination of CMC from surface tension measurements.	4 4
Mar	**Theory , SEC** Analysis of food products	6	**Theory :** **CC8:** Derivation of mean ionic activity coefficient from the expression of ion-atmosphere interaction potential; Applications of the equation and its limitations. **Practical : CC-8**	8	**Theory :** **CC14:** Vibrational spectroscopy **Practical : CC-14** Verification of Beer and Lambert's Law for $KMnO_4$ and $K_2Cr_2O_7$ solution.	4 4

Apr	**Theory , SEC** Analysis of water	6	**Theory :** **CC8:** Quantitative aspects of Faraday's laws of electrolysis, rules of oxidation/reduction of ions based on half-cell potentials, reversible and irreversible cells **Practical : CC-8** Potentiometric titration of Mohr's salt solution against standard K2Cr2O7 solution.	6 4	**Theory :** **CC14:** Raman spectroscopy: **Practical : CC-14** Determination of pH of unknown buffer, spectrophotometrically.	4 4
May	**Theory , SEC** Special classes + doubt clearing+ discussions	6	**Theory :** **CC8:** Nernst equation, Concentration cells **Practical : CC-8** Determination of Ksp for AgCl by potentiometric titration of AgNO3 solution against standard KCl solution.	8 4	**Theory : CC14** NMR **Practical : CC-14** Doubt clearing	4
June	**Theory , SEC** Special classes + doubt clearing+ discussions	6	**Theory :** **CC8: :** Special classes + doubt clearing+ discussions	4	**Theory :** **CC14:** Special classes + doubt clearing+ discussions **Practical : CC-14** Doubt clearing	4 4

Head of the Department,
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DEPARTMENT OF CHEMISTRY

TEACHING PLAN OF PROF TRIJIT BHATTACHARYYA
Chemistry (General) (2023-24) (July 2023 – June 2024)

Month	Sem-I (G)	No. of Lectures	Sem-III (G)	No. of Lectures	Sem-V (G)	No. of Lectures
Jul	**Theory:** **Paper code:** CHEM102-I Aliphatic Hydrocarbons **Practical** Paper code: CHEM102-I Determination of boiling point	4	**Theory:SEC-1:** Analytical clinical biochemistry: Carbohydrates Part 1	4		
Aug	**Theory:** **Paper code:** CHEM102-I Alkenes-Preparation, elimination reaction,dehydration of alcohols,dehydrohalogenation **Practical** Paper code: CHEM102-I Identification of pure organic compound: Oxalic acid, Succinic acid,, Resorcinol	4	**Theory:SEC-1:** Analytical clinical biochemistry: Carbohydrates part 2	4	:	
Sept	**Theory:** **Paper code:** CHEM102-I Cis alkenes, trans alkenes(Birch reaction),Addition of HX, Markonikoffs andv anti Markonikoff addition, Hydration **Practical** Paper code: CHEM102-I Identification of	4	; **Theory:SEC-1:** Analytical clinical biochemistry:Proteins Part 1	4	.	

Month	Theory/Practical		Theory:SEC-1		Sem-VI (G)	
	pure organic compound:Urea, glucose, benzoic acid, Salicylic acid					
Oct	**Theory: Paper code:** CHEM102-I Ozonolysis, Oxymercuration demercuration, Hydroboration Practical **Practical** Paper code: CHEM102-I Identification of pure organic compound:Acetone, aniline	4	**Theory:SEC-1:** Analytical clinical biochemistry: Proteins Part 2	3		
Nov	**Theory: Paper code:** CHEM102-I Cis addition(Alkaline KMNO4) and trans addition of bromine Practical **Practical** Paper code: CHEM102-I Identification of pure organic compound: nitrobenzene	4	**Theory:SEC-1:** Analytical clinical biochemistry: Structure of DNA and RNA	5		
Dec	Revision	4	**Theory:SEC-1:** Analytical clinical biochemistry: Enzymes	2 2		
Jan	**Sem-II (G) Practical** Paper code: CHEM202-I Determination of Ph of unknown strong alkali and acid by colour matching		**Sem-IV (G)**		**Sem-VI (G)**	

Month	Practical		Theory				
	method Study of kinetics of hydrolysis nof methyl acetate						
		3	**Theory :** **CC-1D:** **Chromatographic methods**	3			
Feb	**Practical** Paper code: CHEM102-I Estimation of Mohr salt by KmnO$_4$	4	**Theory :** **CC-1D :** Volumetric analysis of NaHCO$_3$ and Na$_2$CO$_3$ by acidimetry	4			
Mar	**Practical** Paper code: CHEM102-I Estimation of sodium carbonate nd sodiumbicarbonate in amixture	4	**Theory :** **CC-1D** *Environmental Chemistry*: The Atmosphere,Structure and composition .	4			
Apr	**Practical** Paper code: CHEM102-I		**Theory :** **CC-1D:** *Environmental Chemistry*: The	2			

Month							
	Revision	4	Atmosphere,Pollutants				
May	**Practical** Paper code: CHEM102-I Revision	3	**Theory :** **CC-1D** *Environmental Chemistry*: The Atmosphere, problem of ozone layer depletion	3			
June	**Practical** Paper code: CHEM102-I Revision	2	**Theory :** **CC-1D:** *Environmental Chemistry*: The Atmosphere pollution control measures	1			

Trajit Bhattacharyya
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DEPARTMENT OF CHEMISTRY

TEACHING PLAN OF PROF PANKAJ ROY
Chemistry (General) (2023-24) (July 2023 – June 2024)

Month	Sem-I (MINOR)	No. of Lectures	Sem-III (G)	No. of Lectures	Sem-V (G)	No. of Lectures
Jul			**Theory:CC-1C:** Chemical Energetics ;thermodynamics;state and path functions; **Practical :** Measurement of pH of different solutions	4 4	**Theory** **SEC-3:** **Basics & Application of Computer in Chemistry** *Mathematics;*Fundamentals:	4
Aug			**Theory:CC-1C:** Chemical Energetics ;thermodynamics;Concept of heat, work, internal energy and statement of first law; **Practical :**Measurement of pH of different solutions	4 4	**Theory** **SEC-3: Basics & Application of Computer in Chemistry** *Mathematics;*Uncertainty in measurement:	4
Sept			**Theory:CC-1C:** Chemical Energetics ;thermodynamics;Heats of reaction; **Practical :** Preparation of buffer solutions and find the pH	4 6	.**Theory:SEC-3: Basics & Application of Computer in Chemistry** *Mathematics;*Differential calculus:	4
Oct			**Theory:CC-1C:** Chemical Energetics ;thermodynamics;Laws of thermochemistry;	3	**Theory :** **SEC-3: Basics & Application of Computer in**	3

Month	Sem-II (MINOR)		Sem-IV (G)		Sem-VI (G)		
			Practical : Study of the solubility of benzoic acid in water	2	**Chemistry** *Computer Programming;*Simple computer programs,Statistical analysis.		
Nov			**Theory:CC-1C:** Chemical Energetics ;thermodynamics;second law of thermodynamics; **Practical :** Practice.	5 2	**Theory:SEC-3 :Basics & Application of Computer in Chemistry** *Computer Programming ;*BASIC programs for curve fitting, finding roots.	3	
Dec			**Theory:CC-1C:** Special classes: **Practical** Practice.	2 2	**Theory :** **SEC-3:**Special classes:	2	
	Sem-II (MINOR)		**Sem-IV (G)**		**Sem-VI (G)**		
Jan		3 2	**Theory :** **CC-1D:***Solutions ;*Ideal solutions and Raoult's law ; **Practical :** **CC-1D:**Distribution Law;Study of the equilibrium	3 2	*Theory :* **SEC-4 :***Introduction and history of polymeric materials.* *Theory:* ***DSE-1B:* Industrial Chemistry;**Polymers: basic concept.	2 2	
Feb		4	**Theory :** **CC-1D** :*Solutions;*Distillation of	4	**Theory :** **SEC-4:**Functionality and its importance in	2	

			solutions; curves of ideal and non-ideal solutions;		polymer chemistry.		
		2	Practical : CC-1D: potentiometric titration: r.	4	Theory : DSE-1B: structure and types of plastics.	2	
Mar		5	Theory :*Solutions;*solvent extraction	4	Theory : SEC-4:Kinetics of polymerization.	2	
			Phase rule ;phase equilibrium;	4	Theory : DSE 1B:PVC; manufacture, physical properties.	2	
		2	CC-1D: Practical: CC-1D; potentiometric titration: .				
Apr		4	Theory : CC-1D:Phase rule ;thermodynamic derivation;	4	Theory : SEC-4: Properties of polymers.	2	
		2	Practical : CC-1D; Determination of dissociation constant	4	Theory : DSE 1B: Paints: constituents; formulation.	2	
May		3	Theory : CC-1D: *Phase Equilibria;*Phase diagrams	3	Theory SEC-4: Determination of molecular weights.	2	
		2	Practical : CC-1D: Determination of dissociation constant	2	Theory : DSE1B: Binders and solvents for paints.	2	
June			Theory :	1	Theory :		

| | | 2 | **CC-1D:** Special classes. **Practical :**Special classes. | 1 | **SEC-4:** Special classes. **Theory :** **DSE1B :**Special classes. | 1
1 | |

Head of the Department,
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TEACHING PLAN OF DEBABRATA SAHA
Chemistry (General) (2022-23) (July 2022-June 2023)

Month	SEM I(G)	SEM-III(G)	SEM-V
Jul	**MODULE-02** **(Chemical Periodicity)** **UNIT-I** Classification of elements on the basis of electronic configuration: general characteristics of s-, p-, d- and f-block elements.	NO CLASSES	**MODULE-01** **UNIT-I (Transition Elements(3d):** General group trends with special reference to electronic configuration, variable valency, colour, magnetic and catalytic properties, ability to form complexes and stability of various oxidation states (Latimer diagrams) for Mn, Fe and Cu.
Aug	**MODULE-02** **(Chemical Periodicity)** **UNIT-II** Positions of hydrogen and noble gases. Atomic and ionic radii, ionization potential, electron affinity, and electronegativity.	NO CLASSES	**MODULE-01** **UNIT-II (Lanthanoids and actinoids):** Electronic configurations, oxidation states, colour, magnetic properties, lanthanide contraction, separation of lanthanides (ion exchange method only).
Sept	**MODULE-02** **(Chemical Periodicity)** **UNIT-III** Periodic and group-wise variation of above properties in respect of s- and p- block elements.	NO CLASSES	**MODULE-04** **UNIT-I (Error analysis):** accuracy and precision of quantitative analysis, determinate, indeterminate, systematic and random errors; methods of least squares and standard deviations.
Oct	**MODULE-04 (Redox reactions)** **UNIT-I** Balancing of equations by oxidation number and ion-electron method oxidimetry and reductimetry.	NO CLASSES	**MODULE-05** **UNIT-I (Fertilizers):** manufacture of ammonia &ammonium salts,urea,superphosphate,biofertilizers. **UNIT-II (Cement):** Portland cement: composition and setting of cement, white cement.
Nov	Special classes+ doubt clearing+ discussions	NO CLASSES	Problem solving + discussions and evaluation.
Dec	Doubt clearing+ discussions + evaluation.	NO CLASSES	Problem solving + discussions and evaluation.
Jan	**SEM-II (G)**	**SEM-IV(G)**	**SEM-VI (G)**
	MODULE-5B UNIT-III Covalent bonding: VB Approach: Shapes of some inorganic molecules and ions on the basis of VSEPR and hybridization with suitable examples of linear, trigonal planar, squareplanar, tetrahedral, trigonal bipyramidal and octahedral arrangements.	NO CLASSES	NO CLASSES
Feb	MODULE-5C UNIT-IV Concept of resonance and resonating structures in various inorganic and organic compounds.	NO CLASSES	NO CLASSES
Mar	MODULE-5D UNIT-V MO Approach: Rules for the LCAO method, bonding and antibonding MOs and their characteristics for s-s, s-p and p-p combinations of atomic orbitals, nonbonding combination of orbitals.	NO CLASSES	NO CLASSES
Apr	MODULE-05 UNIT-VI MO treatment of homonuclear diatomic molecules of 1st and 2nd periods. (including idea of s- p mixing) and heteronuclear diatomic molecules such as CO, NO and NO+. Comparison of VB and MOapproaches.	NO CLASSES	NO CLASSES
May	Special classes+ doubt clearing+ discussions.	NO CLASSES	NO CLASSES
Jun	Doubt clearing+ discussions + evaluation.	NO CLASSES	NO CLASSES

SURI VIDYASAGAR COLLEGE
Department of Chemistry
Teaching Plan of *Dr. Sandip Mondal* for the General Course (2022-2023)

Month	SEM-I (MINOR)	SEM-III	SEM-V
Jul	**Basic Chemistry-I (CHEM1011) ATOMIC STRUCTURE(MODULE-01)** **UNIT-1** Atomic Structure: Bohr's theory for hydrogen atom (simple mathematical treatment), atomic spectra of hydrogen and Bohr's model, Sommerfeld's model.	**Course Code-**CC-1C/GE-3 *Ionic Equilibria*: Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water.	**Course Code-**DSE-1A/GE-5 *Coordination Chemistry* a. Werner's coordination theory, Valence Bond Theory (VBT): Inner and outer orbital complexes of Cr, Fe, Co, Ni and Cu (coordination numbers 4 and 6).
Aug	**Basic Chemistry-I (CHEM1011) ATOMIC STRUCTURE(MODULE-01)** **UNIT-II** Atomic Structure: Quantum numbers and their significance, Pauli's exclusion principle, Hund's rule, electronic configuration of many-electron atoms, Aufbau principle and its limitations	**Course Code-**CC-1C/GE-3 Ionization of weak acids and bases, pH scale, common ion effect Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts.	**Course Code-**DSE-1A/GE-5 Structural and stereoisomerism in complexes with coordination numbers 4 and 6. b. Drawbacks of VBT; IUPAC system of nomenclature.
Sept	**Basic Chemistry-I (CHEM1011) PERIODIC PROPERTIES (MODULE-02)** **UNIT-1** Classification of elements on the basis of electronic configuration: general characteristics of s-, p-, d- and f-block elements, positions of hydrogen and noble gases. Atomic and ionic radii, ionization potential, electron affinity and electronegativity,periodic and group-wise variation of above properties in respect of sand p- block elements	**Course Code-**CC-1C/GE-3 Buffer solutions; Solubility and solubility product of sparingly soluble salts – applications of solubility product principle.	**Course Code-**DSE-1A/GE-5 Crystal field effect, octahedral symmetry. Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong fields.
Oct	**Basic Chemistry-I (CHEM1011) ACIDS AND BASES (MODULE-03)** **UNIT-1** Brönsted–Lowry concept, conjugate acids and bases, relative strengths of acids and bases, effects of substituent and solvent, differentiating and levelling solvents,Lewis acid-base concept,	Special class, questions -answers discussion and evaluation.	**Course Code-**DSE-1A/GE-5 Tetrahedral symmetry. Spectrochemical series. Comparison of CFSE for Oh and Td complexes, Tetragonal distortion of octahedral geometry. .

	classification of Lewis acids and bases		
Nov	**Basic Chemistry-I (CHEM1011)** ACIDS AND BASES **(MODULE-03)** **UNIT-1** Lux-Flood concept and solvent system concept, hard and soft acids and bases (HSAB concept), applications of HSAB process, acidity and basicity of common organic compounds	Special class, questions -answers discussion and evaluation.	**Course Code-**DSE-1A/GE-5 Jahn-Teller distortion, Square planar coordination
Dec	Special class, questions -answers discussion and evaluation.	Special class, questions -answers discussion and evaluation.	Special class, questions -answers discussion and evaluation.
	SEM-II	**SEM-IV**	**SEM-VI**
Jan	No Inorganic Core Course for SEM-Ii Honours. No Classes.	**Course Code-**CC-1D/GE-4 Volumetric analysis: primary and secondary standard substances; principles of acid-base, oxidation –reduction and complexometric titrations.	**NO CLASSES**
Feb		**Course Code-**CC-1D/GE-4 Indicators: acid-base, redox and metal ion, principles of estimation of mixtures: $NaHCO_3$ and Na_2CO_3 (by acidimetry)	**NO CLASSES**
Mar		**Course Code-**CC-1D/GE-4 Principles of estimation of mixtures: iron, copper, manganese and chromium (by redox titration); zinc, aluminum, calcium and magnesium (by complexometric EDTA titration).	**NO CLASSES**
Apr		**Course Code-**CC-1D/GE-4 Chromatography: Chromatographic methods of analysis: column chromatography and thin layer chromatography.	**NO CLASSES**
May		**Course Code-**CC-1D/GE-4 Gravimetric analysis: solubility product and common ion effect; requirements of gravimetry; gravimetric estimation of chloride, sulphate, lead, barium, nickel, copper and zinc.	**NO CLASSES**
June		Special/Remedial class, questions -answer discussions and numerical problem solve	**NO CLASSES**

Head of the Department,

Department of Chemistry

Suri Vidyasagar College

DEPARTMENT OF CHEMISTRY

TEACHING PLAN OF Mrs. Ishani Sinha
Chemistry (General) (2022-23) (July 2022 – June 2023)

Month	Sem-I (G)	No. of Lecture	Sem-III (G)	No. of Lecture	Sem-V (G)	No. of Lecture
Jul	**Theory:** CC1A/GE1: Electronic Displacement: Inductive Effect, Resonance, Hyperconjugation, Homolytic and Heterolytic fission of bonds, Structure of organic molecules on the basis of VBT, Nucleophile, Electrophile, Reactive Intermediate: Carbonation, Carbanion, Free Radicals. **Practical** CC1A/ GE1: Lassaigne Test: Detection of Special Elements	6 2	**Theory** CC1C/GE3: Aromatic hydrocarbons: Benzene, preparation from phenol, decarboxylation, acetylene, brnzene sulphonic acid. Reaction: General Mechanism of aromatic electrophilic substitution. **Practical** CC1C/GE3: Identification of pure organic compounds: oxalic acid, succinic acid	7 2	**Theory** DSE 1A: Fuels **Practical** DSE 1A: 1.Titration of Na2CO3 and NaHCO3 mixture by HCl using Phenolpthalein indicator. 2.Practice classes.	3 2
Aug	**Theory:** CC1A/GE1: Stereochemistry CC1A/ GE 1: Solubility Test of solid organic compounds.	6 2	**Theory** CC1C/GE3: Nitration, Halogenation, Sulphonation, Fridel Craft Alkylation, acetylation and side chain oxidation of aromatic hydrocarbons. **Practical** CC1C/GE3: Identification of pure organic compounds: Salicylic Acid, Benzoic Acid	5 2	**Theory** DSE 1A : Fertilizers **Practical** DSE1A: 1.Titration of HCl and CH3COOH mixture by NaOH using different indicators. 2.Practice classes.	4 2
Sept	**Theory:** CC1A/GE1: Substitution and Elimination Reaction: SN1,SN2, E1,E2, Saytzeff and Hoffmann Elimination Alkanes. Preparation: Catalytic hydrogenation, Wurtz Reaction, Kolbe Synthesis, From Grignard Reagent. **Practical** CC1A/GE1: Detection of functional group: -COOH, phenolic -OH, carbonyl group.	6 2	**Theory** CC1C/GE3: Aryl Halides, Preparation from Phenol, Sandmeyer Reaction, Nucleophilic Aromatic Substitution, Effect of Nitro group **Practical** CC1C/GE3: Identification of pure organic compounds: Resorcinol, Urea ,	4 2 2	.**Theory** DSE 1A: Glass and Ceramics : Part 1 **Practical** DSE 1A: 1.Estimation of total hardness of water by standard EDTA solution. 2. Practice classes.	3 2
Oct	**Theory:** CC1A/ GE1: Reaction of alkanes: General Mechanism for free radical substitution and Halogenation; Alkene. Preparation: Dehydration of Alcohol, Dehydrohalogenation. Cis Alkene and Trans Alkene. **Practical** CC1A/GE1: Detection of functional group: Ar -NO2 and Ar -NH2 group	6 2	**Theory** CC1C/GE3 : Grignard Reagent, Preparation, Concept of Umpolung,Reformatsky reaction **Practical** CC1C/GE3 : Identification of pure organic compounds: Glucose, Acetone	4 2 2	**Theory** DSE 1A : Glass and Ceramics: Part 2 **Practical** DSE 1A: **Practice classes**	3 2
Nov	**Theory:** CC1A/GE1: Alkene. Cis addition, Trans addition, Markownikoff's Addition and anti Markownikoff's Addition, hydration, ozonolysis, oxymercuration, demercuration,	4 2	**Theory** CC1C/GE3 : Reimer Tiemann Reaction, Houben Hoesch Reaction, Schotten Baumann Reaction, Fries and Claisen Rearrangements, Problems with examples	5 2	Theory DSE 1A : Cement Practical	3 2

	hydroboration, oxidation. **CC1A/GE1: Detection of unknown organic sample**		**Practical CC1C/GE3 :Identification of pure organic compounds: Aniline , Nitrobenzene** .	2	DSE 1A : Practice classes	
Dec	**Theory: CC1A/GE1: Organic chemistry** Alkyne. Preparation and conversation into higher alkynes. Formation of metal acetylides, addition of Br2 and alkaline KMnO4 **Practical CC1A/GE1: Organic Chemistry** Practice classes	4 2	**Theory Revision and discussion of previous lessons Practical CC1C/GE3 :Unknown Samples**	3 1 1	**Theory DSE1A : Revision and doubt clearing classes** **Practical DSE 1A : Revision**	3 3
	Sem-II (G)		**Sem-IV (G)**		**Sem-VI (G)**	
Jan	**Theory CC1B/GE2:** **Practical CC1B/GE2:**		**Theory CC1D/GE4:Environmental Chemistry: Hydrosphere : Environmental Role of Water** **Practical CC1D/GE4:** Estimation of total hardness of water by titration with EDTA. .	4 2 2	**Theory DSE-1B : Amino acids** **Practical DSE-1B: 1. Nitration of acetanilide 2.. practice classes**	4 2
Feb	**Theory CC1B/GE2:** **Practical CC1b/GE2 :**		**Theory CC1D/GE 2-** Waste Water Management **Practical CC1D/GE4:** 3. Acid Catalysed Hydrolysis of Ester	3 2	**Theory DSE-1B: Carbohydrates: Part 1** **Practical DSE-1B : Hydrolysis of Benzamide, Practice classes**	4 3

Month						
Mar	**Theory** **CC1b/GE2 :** **Practical** **CC1b/ GE 2:**		**Theory** **CC1D/GE4: BOD, COD , DO and Hardness parameters of water etc.** **Practical** **CC1D/GE4:** Determination of strength of H2O2	4 2	**Theory** **DSE-1B :** **Carbohydrates: Part 2** **Practical** **DSE-1B :** **Benzoylation of Aniline.** **Practice classes** .	4 3
Apr	**Theory** **CC1b/GE2 :** **Pracical** **CC1b/ GE 2:**		**Theory** SEC 2 : Drugs and Pharmaceutical Chemistry: Drug discovery and synthesis, use and adverse effects of analgesic, antipyretic and anti inflammatory drugs. **Practical** **CC1D/GE4: Revision.**	5 2	**Theory** DSE 1B: Drugs and Pharmaceuticals: Preparation and uses of Aspirin, Paracetamol, Sulphadiazine, Metronidazole **Practical** **DSE-1B: Estimation of saponification value of oil.** **Practice classes** .	3 2
May	**Theory** **CC1b/GE2 :** **Practical** **CC1b/GE2 :**		**Theory** SEC 2 : Synthesis, use and adverse effects of antibiotic, anti bacterial and anti fungal drugs. **Practical** **CC1D/GE4 : Revision**	5 2	**Theory** **DSE-1B: Pesticides: Gammaxene, Parathion, DDT** **Practical** **DSE-1B : Estimation of Acetic acid in commercial vinegar**	2 3

June	**Theory** **CC1b/GE2 :** **Practical** **CC1b/ GE2 :**		**Theory** **SEC 2 : Synthesis, use and adverse effects of antiviral and CNS depressant drugs, HIV related drugs.** **Practical** **CC1D/GE4 : Practical Revision**	4 3	Theory DSE 1B: Food additives **Practical** **DSE-1B: Revision classes**	3 2

Head of the Department,
Department of Chemistry
Suri Vidyasagar College

DEPARTMENT OF CHEMISTRY

TEACHING PLAN OF SOURAV KUMAR DAS
Chemistry (General) (2023-24) (July 2023 – June 2024)

Month	Sem-I (G)	No. of Lectures	Sem-III (G)	No. of Lectures	Sem-V (G)	No. of Lectures
Jul			**Theory** **CC-1C:** Thermodynamic conditions for equilibrium, K_P, K_C and K_X, van't Hoff's reaction isotherm, Le Chatelier's principle	4	. Theory DSE-1A *Coordination Chemistry* a. Werner's coordination theory, Valence Bond Theory (VBT): Inner and outer orbital complexes of Cr, Fe, Co, Ni and Cu (coordination numbers 4 and 6).	8
Aug			**Theory** **CC-1C:** degree of ionization, ionic product, Salt hydrolysis,pH	4	. . Theory DSE-1A stereoisomerism , Drawbacks of VBT; IUPAC system of nomenclature. *Crystal Field Theory*	8
Sept			**Theory:** CC-1C: Buffer solutions; Solubility, solubility product, applications	4	. . Theory DSE-1A Spectrochemical series. Comparison of CFSE for Oh and Td complexes, Tetragonal distortion of octahedral geometry. b. Jahn-Teller distortion, Square planar coordination.	8
Oct			**Theory :** Course Code: SEC-1 Carbohydrates, Proteins	4	Theory DSE-1A Error analysis: accuracy and precision	8
Nov			**Theory :** Course Code: SEC-1 DNA,Enzyme	4	Theory DSE-1A Computer applications:	8
Dec			**Theory :**		;	

Month	Sem-II (G)		Sem-IV (G)		Sem-VI (G)	
			Course Code: SEC-1 Blood , Urine:	4	Theory DSE-1A (Theo) Doubt clearing	4
	Sem-II (G)		**Sem-IV (G)**		**Sem-VI (G)**	
Jan			**Theory :** **CC-1D** Solutions Phase Equilibria	8	*Theory :* DSE-1B (Theo) Carboxylic acids (aliphatic and aromatic):	4
Feb			**Theory : CC-1D** Conductance	8	**Theory :** DSE-1B Carboxylic acid derivatives (aliphatic):	4
Mar			**Theory :CC-1D:** Cell .	8	**Theory :** DSE-1B Amines and Diazonium Salts	4

Apr			**Theory :CC-1D** Gravimetric analysis, Volumetric analysis,Chromatography	**8**	**Theory :** DSE-1B: Amino Acids	**4**
May			**Theory :CC-1D:** Environmental Chemistry	**8**	**Theory:** DSE-1B Carbohydrates	**4**
June			**Theory : CC-1D** Special classes	**4**	**Theory :** DSE-1B Special classes Doubt clearing	**4**

Head of the Department,
Department of Chemistry,
Suri Vidyasagar College

DEPARTMENT OF COMPUTER SCIENCE

TEACHING PLAN OF SRI HARADHAN MARDI
Computer Science (General) (2023-24) (July 2023 – June 2024)

TABLE-1: 1ST YEAR

Month	Sem-I(G) Major & SEC	No. of Lectures	Sem-I(G) Minor & ID/MD	No. of Lectures
Jul	**Theory (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Unit1: Introduction to Computer and Problem Solving Unit2: Introduction to Programming Languages Unit3: Number representation	10	**Theory (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Unit1: Introduction to Computer and Problem Solving Unit2: Introduction to Programming Languages Unit3: Number representation	10
	Practical (Major): **COMP 1011: Computer Fundamentals & Digital Logic** Combinational Circuits: Adder- Subtractor	3	**Practical (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Combinational Circuits: Adder-Subtractor	3
	Practical (SEC): **COMP 1051: Programming in Python** Unit1: Planning the Computer Program	10	**Theory (ID/MD):** **COMP 1031: Basic IT Tools** Unit1: Introduction Unit2: Windows Basics	10
Aug	**Theory (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Unit4: Boolean Algebra Unit5: Combinational Circuits	10	**Theory (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Unit4: Boolean Algebra Unit5: Combinational Circuits	10
	Practical (Major): **COMP 1011: Computer Fundamentals & Digital Logic** Combinational Circuits: Decoder, MUX, Encoder	3	**Practical (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Combinational Circuits: Decoder, MUX, Encoder	3
	Practical (SEC): **COMP 1051: Programming in Python** Unit2: Techniques of Problem Solving	10	**Theory (ID/MD):** **COMP 1031: Basic IT Tools** Unit2: Windows Basics Unit3: Introduction to worksheet and shell	10
Sept	**Theory (Major):** **COMP 1011: Computer Fundamentals & Digital**	9	**Theory (Major):** **COMP 1011: Computer Fundamentals & Digital Logic**	9

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Month				
	Logic Unit5: Combinational Circuits Unit6: Sequential Circuits **Practical (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Combinational Circuits: Parity Generator, Magnitude Comparator, Flip-Flops **Practical (SEC):** **COMP 1051: Programming in Python** Unit3: Overview of Programming Unit4: Introduction to Python	3 9	Unit5: Combinational Circuits Unit6: Sequential Circuits **Practical (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Combinational Circuits: Parity Generator, Magnitude Comparator, Flip-Flops **Theory (ID/MD):** **COMP 1031: Basic IT Tools** Unit4: Creating charts Unit5: Introduction to Database Development	3 9
Oct	**Theory (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Unit6: Sequential Circuits Unit7: Asynchronous Counter **Practical (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Sequential Circuits: Flip-Flops **Practical (SEC):** **COMP 1051: Programming in Python** Unit4: Introduction to Python	6 2 6	**Theory (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Unit6: Sequential Circuits Unit7: Asynchronous Counter **Practical (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Sequential Circuits: Flip-Flops **Theory (ID/MD):** **COMP 1031: Basic IT Tools** Unit5: Introduction to Database Development	6 2 6
Nov	**Theory (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Unit7: Asynchronous Counter Unit8: Synchronous Counters **Practical (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Sequential Circuits: Registers **Practical (SEC):** **COMP 1051: Programming in Python** Unit5: Creating Python Programs	6 2 8	**Theory (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Unit7: Asynchronous Counter Unit8: Synchronous Counters **Practical (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Sequential Circuits: Registers **Theory (ID/MD):** **COMP 1031: Basic IT Tools** Unit5: Introduction to Database Development Unit6: Overview of Power point	6 2 8
Dec	**Theory (Major):**	4	**Theory (Major):**	4

	Sem-II(G) Major & SEC	No. of Lectures	Sem-II(G) Minor & ID/MD	No. of Lectures
	COMP 1011: Computer Fundamentals & Digital Logic Unit8: Synchronous Counters **Practical (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Sequential Circuits: Counter **Practical (SEC):** **COMP 1051: Programming in Python** Unit5: Creating Python Programs	2 2	**COMP 1011: Computer Fundamentals & Digital Logic** Unit8: Synchronous Counters **Practical (Major):** **COMP 1011: Computer Fundamentals & Digital Logic** Sequential Circuits: Counter **Theory (ID/MD):** **COMP 1031: Basic IT Tools** Unit6: Overview of Power point	2 2
Jan	**Theory (Major):** **COMP 2011: Programming Fundamentals using C** Unit1: Introduction **Practical (Major):** **COMP 2011: C language Practical** Programs on Introduction to C **Practical (SEC):** **COMP 2051: System Administration and Maintenance** Part I (Linux/Unix)	10 3 10	**Theory (Minor):** **COMP 2021: Python Programming** Unit1: Planning the Computer Program **Practical (Minor):** **COMP 2021: Python Programming** Section: A (Simple programs) **Theory (ID/MD):** **COMP 2031: Introduction to Internet** Unit1: Introduction Unit2: Usenet and Internet Relay Chart Introduction to WWW	10 3 10
Feb	**Theory (Major):** **COMP 2011: Programming Fundamentals using C** Unit1: Introduction Unit2: Functions **Practical (Major):** **COMP 2011: C language Practical** Programs on Introduction to C Programs on Functions **Practical (SEC):** **COMP 2051: System Administration and Maintenance** Part I (Linux/Unix)	10 3 10	**Theory (Minor):** **COMP 2021: Python Programming** Unit2: Techniques of Problem Solving **Practical (Minor):** **COMP 2021: Python Programming** Section: B (Visual Python) **Theory (ID/MD):** **COMP 2031: Introduction to Internet** Unit3: WWW Browsers Unit4: Search Engines	10 3 10
Mar	**Theory (Major):** **COMP 2011: Programming Fundamentals using C** Unit2: Functions	9	**Theory (Minor):** **COMP 2021: Python Programming** Unit3: Overview of	9

	Unit3: Pointers		Programming	
	Practical (Major): COMP 2011: C language Practical	**3**	Unit4: Introduction to Python	**3**
	Programs on Functions		**Practical (Minor): COMP 2021: Python Programming**	
	Programs on Pointers		Section: B (Visual Python)	
	Practical (SEC): COMP 2051: System Administration and Maintenance	**9**	**Theory (ID/MD): COMP 2031: Introduction to Internet** Unit5: Internet Security Unit6: HTML	**9**
	Part I (Linux/Unix)			
	Part II (Windows)			
Apr	**Theory (Major): COMP 2011: Programming Fundamentals using C**	**6**	**Theory (Minor): COMP 2021: Python Programming**	**6**
	Unit3: Pointers		Unit4: Introduction to Python	
	Practical (Major): COMP 2011: C language Practical	**2**	**Practical (Minor): COMP 2021: Python Programming**	**2**
	Programs on Pointers		Section: B (Visual Python)	
	Practical (SEC): COMP 2051: System Administration and Maintenance	**6**	**Theory (ID/MD): COMP 2031: Introduction to Internet** Unit6: HTML	**6**
	Part II (Windows)			
May	**Theory (Major): COMP 2011: Programming Fundamentals using C**	**6**	**Theory (Minor): COMP 2021: Python Programming**	**6**
	Unit3: Pointers Unit4: File Handling		Unit5: Creating Python Programs	
	Practical (Major): COMP 2011: C language Practical	**2**	**Practical (Minor): COMP 2021: Python Programming**	**2**
	Programs on Pointers		Section: B (Visual Python)	
	Programs on File Handling		**Theory (ID/MD): COMP 2031: Introduction to Internet** Unit6: HTML	**6**
	Practical (SEC): COMP 2051: System Administration and Maintenance	**6**		
	Part II (Windows)			
Jun	**Theory (Major): COMP 2011: Programming Fundamentals using C**	**4**	**Theory (Minor): COMP 2021: Python Programming**	**4**
	Unit4: File Handling		Unit5: Creating Python Programs	
	Practical (Major): COMP 2011: C language Practical	**2**	**Practical (Minor): COMP 2021: Python**	**2**

Programs on File Handling **Practical (SEC): COMP 2051: System Administration and Maintenance** Part II (Windows)	**4**	**Programming** Section: B (Visual Python) **Theory (ID/MD): COMP 2031: Introduction to Internet** Unit6: HTML	**4**

TABLE-2: 2 ND YEAR & 3 RD YEAR

Month	Sem-III (G)	No. of Lectures	Sem-V (G)	No. of Lectures
Jul	**Theory** **CC-1C: Operating Systems** Unit1: Introduction Unit2: Types of operating systems Unit3: Operating System Organization	**14**	**Theory** **DSE-1A: Programming in Java** Unit1: Introduction to Java Unit2: Object Oriented Programming Concept Unit3: Java Programming Fundamental	**13**
	Practical **CC-1C: Operating Systems** Shell scripting with basic commands	**4**	**Practical** **DSE-1A: Programming in Java** Basic Java programming	
	Theory **SEC1:Office Automation Tools** Unit1: Introduction to open office/MS office/Libre office Unit2: Word Processing	**4**	**Theory** **SEC3: MySQL/ PL-SQL** Unit1:SQL Vs. SQL * Plus Unit2:Managing Tables and Data	**4** **4**
	Practical **SEC1:Office Automation Tools** MS Word	**2**	**Practical** **SEC3: MySQL/ PL-SQL** SQL commands	**2**
Aug	**Theory** **CC-1C: Operating Systems** Unit 4: Process Management	**15**	**Theory** **DSE-1A: Programming in Java** Unit3: Java Programming Fundamental Unit4: Classes and Objects	**12**
	Practical **CC-1C: Operating Systems** Shell scripting	**4**	**Practical** **DSE-1A: Programming in Java** Programming using concepts of Classes and objects	
	Theory **SEC1:Office Automation Tools** Unit2: Word Processing	**4**	**Theory** **SEC3: MySQL/ PL-SQL** Unit2:Managing Tables and Data	**4**
	Practical **SEC1:Office Automation Tools** MS Word	**2**	**Practical** **SEC3: MySQL/ PL-SQL** SQL Functions	**4**

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Sept	**Theory** **CC-1C: Operating Systems** Unit 5: Scheduling **Practical** **CC-1C: Operating Systems** Shell scripting **Theory** **SEC1:Office Automation Tools** Unit3: Spreadsheets **Practical** **SEC1:Office Automation Tools** MS Excel	12 4 4 2	**Theory** **DSE-1A: Programming in Java** Unit4:Classes and Objects Unit5:Arrays and Strings **Practical** **DSE-1A: Programming in Java** Programming using concepts of Classes, Objects, Strings and Arrays **Theory** **SEC3: MySQL/ PL-SQL** Uni3: Other Database Objects **Practical** **SEC3: MySQL/ PL-SQL** SQL Functions	12 4 4 2
Oct	**Theory** **CC-1C: Operating Systems** Unit 6: Memory Management **Practical** **CC-1C: Operating Systems** Shell scripting **Theory** **SEC1:Office Automation Tools** Unit3: Spreadsheets Special class **Practical** **SEC1:Office Automation Tools** MS Excel	8 4 2 2	**Theory** **DSE-1A: Programming in Java** Unit 6:Abstract Class, Interface and Packages **Practical** **DSE-1A: Programming in Java** Programming with the concepts of Abstract Class, Interface and Packages **Theory** **SEC3: MySQL/ PL-SQL** Unit4: Transaction Control Statements **Practical** **SEC3: MySQL/ PL-SQL** PL/SQL	8 4 4 4 2
Nov	**Theory** **CC-1C: Operating Systems** Unit 6: Memory Management Unit7: Shell introduction and Shell Scripting **Practical** **CC-1C: Operating Systems** Shell scripting **Theory** **SEC1:Office Automation Tools** Unit4: Presentation Tools **Practical** **SEC1:Office Automation Tools** MS PowerPoint	8 4 4 2	**Theory** **DSE-1A: Programming in Java** Unit7:Exception Handling Unit8: File Handling **Practical** **DSE-1A: Programming in Java** Programming with Exception Handling and File Handling **Theory** **SEC3: MySQL/ PL-SQL** Unit4: Transaction Control Statements **Practical** **SEC3: MySQL/ PL-SQL** PL/SQL	9 4 4 2
Dec	**Theory** **CC-1C: Operating Systems** Unit7: Shell introduction and	3	**Theory** **DSE-1A: Programming in Java** Unit9:Applet Programming	6

6

	Shell Scripting **Practical** **CC-1C: Operating Systems** Shell scripting **Theory** **SEC1: Office Automation Tools** Unit4: Presentation Tools **Practical** **SEC1: Office Automation Tools** MS PowerPoint	2 2 2	**Practical** **DSE-1A: Programming in Java** Applet Programming **Theory** SEC3: MySQL/ PL-SQLSpecial Classes **Practical** **SEC3: MySQL/ PL-SQL** Practice classes	2 2 2
	Sem-IV (G)		**Sem-VI (G)**	
Jan	**Theory** **CC-1D: Computer System Architecture** Unit 1: Introduction **Practical** **CC-1D: Computer System Architecture** Designing instruction set **Theory** **SEC-2: HTML Programming** Unit 1: Introduction Unit2: The basics **Practical** **SEC-2: HTML Programming** Applying basic commands	12 4 5 2	**Theory** **DSE-1B: Computer Networks** Unit1: Basic concepts **Practical** **DSE-1B: Computer Networks** Simulating Checksum Algorithm **Theory** **SEC4: PHP Programming** Unit 1:Introduction to PHP Unit 2:Handling HTML form with PHP **Practical** **SEC4: PHP Programming** Solving basic mathematical problems	16 4 6 2
Feb	**Theory** **CC-1D: Computer System Architecture** Unit 2. Data Representation and basic Computer Arithmetic Unit 3: Basic Computer Organization and Design **Practical** **CC-1D: Computer System Architecture** Problem solving using register reference instructions **Theory** **SEC-2: HTML Programming** Unit 3: Links **Practical** **SEC-2: HTML Programming** Creating links	14 4 3 2	**Theory** **DSE-1B: Computer Networks** Unit 2: Physical Layer Unit 3:Data Link Layer **Practical** **DSE-1B: Computer Networks** Simulating CRC Algorithm **Theory** **SEC4: PHP Programming** Unit 3: PHP conditional events and Loops **Practical** **SEC4: PHP Programming** Solving mathematical problems using array	14 4 3 2

Mar	**Theory** **CC-1D: Computer System Architecture** Unit 3: Basic Computer Organization and Design	12	**Theory** **DSE-1B: Computer Networks** Unit 4: Network Layer Unit 5: Transport Layer	14
	Practical **CC-1D: Computer System Architecture** Problem solving using memory-reference instructions	4	**Practical** **DSE-1B: Computer Networks** Simulating Stop & Wait Protocol	4
	Theory **SEC-2: HTML Programming** Unit 4: Images	4	**Theory** **SEC4: PHP Programming** Unit 4: PHP Functions	
	Practical **SEC-2: HTML Programming** Creating images	2	**Practical** **SEC4: PHP Programming** Solving mathematical problems using string	3
				2
Apr	**Theory** **CC-1D: Computer System Architecture** Unit 4: Central Processing Unit	10	**Theory** **DSE-1B: Computer Networks** Unit 6: Application Layer	10
	Practical **CC-1D: Computer System Architecture** Problem solving using input-output reference instructions	4	**Practical** **DSE-1B: Computer Networks** Simulate Go-Back-N Protocol	
			Theory **SEC4: PHP Programming** Unit 5: String Manipulation and Regular Expression	4
	Theory **SEC-2: HTML Programming** Unit 5: Tables	4		
	Practical **SEC-2: HTML Programming** Creating tables	2	**Practical** **SEC4: PHP Programming** Solving mathematical problems using loop	4
				2
May	**Theory** **CC-1D: Computer System Architecture** Unit 5: Programming the Basic Computer Unit 6: Input-output Organization	12	**Theory** **DSE-1B: Computer Networks** Unit 7: Network Security	6
	Practical **CC-1D: Computer System Architecture** Problem solving using different type reference instructions	4	**Practical** **DSE-1B: Computer Networks** Simulating Selective Repeat Protocol	4
	Theory **SEC-2: HTML Programming** Unit 6: Forms	5	**Theory** **SEC4: PHP Programming** Unit 6: Array	
	Practical **SEC-2: HTML Programming** Creating forms	2	**Practical** **SEC4: PHP Programming** Solving mathematical problems using recursion	4
				2

June	**Theory** **CC-1D: Computer System Architecture** Special class	**2**	**Theory** **DSE-1B: Computer Networks** Special Classes	**2**	
	Practical **CC-1D: Computer System Architecture** Repeat practical Class	**1**	**Practical** **DSE-1B: Computer Networks** Repeat practical Class	**1**	
	Theory **SEC-2: HTML Programming** Special class	**1**	**Theory** **SEC4: PHP Programming** Special classes	**2**	
	Practical **SEC-2: HTML Programming** Repeat practical Class	**1**	**Practical** **SEC4: PHP Programming** Repeat practical Class	**2**	

Head of the Department
Department of Computer Science
Suri Vidyasagar College

DEPARTMENT OF MATHEMATICS

TEACHING PLAN OF PROF. SHUBHENDU GHOSH
Mathematics (Honours) (2023-24) (July 2023 – June 2024)

Month	Sem-I (H)	No. of Lecture	Sem-III (H)	No. of Lecture	Sem-V (H)	No. of Lecture
Jul	MATH1011: Calculus: Reduction Formula	4	CC06: Group Theory-1 Unit-1:Groups and its elementary property.	12+2	DSE21: Probability and Statistics Unit-1: Sample space, probability axioms, real random variables, cumulative distribution function, probability mass/density functions, mathematical expectation, moments	14+1
Aug	MATH1011: Calculus: Parametric Equation and Parametrization	4	CC06: Group Theory-1 Unit-2: Sub-groups and examples, Product of two sub-group Unit-3: Cyclic groups and properties, Permutations and Permutation groups	5+1 7+1	DSE21: Probability and Statistics Unit-1: Some discrete and continuous distributions Unit-2: Joint distributions and its properties. marginal and conditional distributions, expectation of function of two random variables	3+1 11+1
Sept	MATH1011: Calculus: Arc length of curves	4	CC06: Group Theory-1 Unit-3: Symmetric and Alternating groups, Cosets, Lagrange's theorem and consequences including Fermat's Little theorem	12+2	DSE21: Probability and Statistics Unit-2: Bivariate normal distribution, correlation coefficient, joint moment generating function, linear regression for two variables Unit-3: Chebyshev's inequality, law of large numbers, Central Limit	6+1 8+1

					theorem	

Month	Sem-I(H)	No. of Lecture		No. of Lecture		No. of Lecture
Oct	MATH1011: Calculus: Area of surface of revolution	2	CC06: Group Theory-1 Unit-4: External direct product of a finite number of groups, normal subgroups.	7+1	DSE21: Probability and Statistics Unit-3: Markov Chains, Chapman-Kolmogorov equations, classification of states	7+1
Nov	MATH1011: Calculus: Area of surface of revolution	3	CC06: Group Theory-1 Unit-4: Factor groups, Cauchy's theorem for finite abelian groups Unit-5: Group homomorphisms, properties of homomorphisms	3+1 10+1	DSE21: Probability and Statistics Unit-4: Random Samples, Sampling Distributions, Estimation of parameters,	15+1
Dec	MATH1011: Calculus: Tutorial Class	3	CC06: Group Theory-1 Unit-5: Cayley's theorem, properties of isomorphisms, First, Second and Third isomorphism theorems. Group discussions and evaluation	7 5	DSE21: Probability and Statistics Unit-4: Testing of hypothesis. Group discussions and evaluation	5+1 5

Month	Sem-II(H)	No. of Lecture	Sem-IV(H)	No. of Lecture	Sem-VI (H)	No. of Lecture
Jan	MATH2011: Algebra: Partial order, total order relations and Partitions of set.	4	CC10: Ring Theory and Linear Algebra I Unit-1: Rings, properties of rings, Sub-rings, Integral domains	10+2	CC14: Ring Theory and Linear Algebra II Unit-1: Polynomial rings over commutative rings, division algorithm and consequences, principal ideal domains, factorization of polynomials	10+2
Feb	MATH2011: Algebra: Lattice, Statement of Zorn's lemma.	4	CC10: Ring Theory and Linear Algebra I Unit-1: Fields, characteristic of a ring, Ideal, factor rings, operations on ideals, prime and maximal ideals	12+2	CC14: Ring Theory and Linear Algebra II Unit-1: Reducibility tests, irreducibility tests, Eisenstein criterion, and unique	12+2

Month						
					factorization in Z [x]	
Mar	MATH2011: Algebra: Groups and sub-groups.	4	CC10: Ring Theory and Linear Algebra I Unit-2: Ring homomorphisms, properties of ring homomorphisms. Isomorphism theorems I, II and III, field of quotients	12+2	CC14: Ring Theory and Linear Algebra II Unit-1: Divisibility in integral domains, irreducible, primes, unique factorization domains, Euclidean domains	10+1
Apr	MATH2011: Algebra: Cosets and normal subgroups.	4	CC10: Ring Theory and Linear Algebra I Unit-4: Linear transformations, null space, range, rank and nullity of a linear transformation, matrix representation of a linear transformation, algebra of linear transformations	12+2	CC14: Ring Theory and Linear Algebra II Unit-2: Dual spaces, dual basis, double dual, transpose of a linear transformation and its matrix in the dual basis, annihilators	12+2
May	MATH2011: Algebra: Rings and subrings, Ideals.	4	CC10: Ring Theory and Linear Algebra I Unit-4: Isomorphisms, Isomorphism theorems, invertibility and isomorphisms	10+2	CC14: Ring Theory and Linear Algebra II Unit-2: Eigen spaces of a linear operator, diagonalizability, invariant subspaces and Cayley-Hamilton theorem, the minimal polynomial for a linear operator	12+2
June	MATH2011: Algebra: Field and sub-field.	3+1	CC10: Ring Theory and Linear Algebra I Unit-4: Change of coordinate matrix Group discussions and evaluation	4 4	CC14: Ring Theory and Linear Algebra II Unit-2: Canonical forms Group discussions and evaluation	4+1 4

Head of the Department,
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TEACHING PLAN OF DR. RAMPROSAD SAHA
Mathematics (Honours) (2023-24) (July 2023 – June 2024)

Month	Sem-I (H)	No. of Lecture	Sem-III (H)	No. of Lecture	Sem-V (H)	No. of Lecture
Jul	**MATH1011: Geometry** Reflection properties of conics, translation and rotation of axes and second degree equations	4	**Theory** **CC7: Numerical Methods** Unit 4: Interpolation: Lagrange and Newton's methods, Error bounds, Finite difference operators. Gregory forward and backward difference interpolations.	5+2	**Theory** **CC11: Partial Differential Equations and Applications** Unit 3: The Cauchy problem of 2nd order partial differential equation, Cauchy-Kowalewskaya theorem,	4+4
	MATH1051: Graph Theory: Definition, examples and basic properties of graphs.	6	**Practical** **CC7: Numerical Methods Lab** Unit 7: 1. Solution of transcendental and algebraic equations by (a) Newton Raphson method.	3+3	**CC12: Mechanics I** Unit 1: Co-planar forces. Astatic equilibrium. Friction.	6
			Theory **SEC1: Logic** Unit 1: Introduction, propositions, truth table, negation	3		
Aug	**MATH1011: Geometry** Classification of conics , polar equations of conics	4	**Theory** **CC7: Numerical Methods** Unit 4: Numerical differentiation: Methods based on interpolations, methods based on finite differences.	4+1	**Theory** **CC11: Partial Differential Equations and Applications** Unit 3: Cauchy problem of an infinite string, Initial and Boundary Value Problems.	3+1
	MATH1051: Graph Theory: Complete graphs, Havel-Hakimi theorem, Bipartite graphs, Isomorphism of graphs	6	**Practical** **CC7: Numerical Methods Lab** Unit 7: 1. Solution of transcendental and algebraic equations by (b) Regula Falsi method.	3+1	**CC12: Mechanics I** Unit 1: Equilibrium of a particle on a rough curve. Virtual work, Forces in three dimensions.	7
			Theory **SEC1: Logic** Unit 1: Conjunction and disjunction. Implications, biconditional propositions	4		
Sept	**MATH1011: Geometry** Spheres, Cylindrical surfaces	4	**Theory** **CC7: Numerical Methods** Unit 5: Numerical Integration: Newton Cotes formula, Trapezoidal rule, Simpson's 1/3rd rule, Simpsons 3/8th rule, Weddle's rule, Boole's rule. Midpoint rule, Composite Trapezoidal rule,	4+3	.**Theory** **CC11: Partial Differential Equations and Applications** Unit 3: Semi-Infinite String with a fixed end, Semi-Infinite String with a Free end.	3+3
	MATH1051: Graph Theory: Konigsberg Bridge problem, Eulerian graph, Hamiltonian graph	6	**Practical** **CC7: Numerical Methods Lab** Unit 7: 2. Solution of system of linear equations (a) Gaussian elimination method	3+3	**CC12: Mechanics I** Unit 1: General conditions of equilibrium, Centre of gravity for different bodies. Stable and unstable equilibrium, Equilibrium of flexible string.	7+2
			Theory **SEC1: Logic** Unit 1: Converse, contra positive and inverse propositions and precedence of logical operators	3		
Oct	**MATH1011: Geometry**: Central conicoids: paraboloids	3	**Theory** **CC7: Numerical Methods** Unit 5: Composite Simpson's 1/3rd rule, Gauss quadrature formula.	3+2	**Theory** **CC11: Partial Differential Equations and Applications** Unit 3: Equations with non-homogeneous	3+1
	MATH1051: Graph					

Month							
	Theory: Representation of a graph by a matrix	3	**Practical** CC7: **Numerical Methods Lab** Unit 7: 2. Solution of system of linear equations (b) Gauss-Seidel method **Theory** SEC1: **Logic** Unit 1 Propositional equivalence: Logical equivalences	2+2 2	boundary conditions. **CC12: Mechanics I** Unit 3: Degrees of freedom, Moments and products of inertia, Momental Ellipsoid.	5+1	
Nov	**MATH1011: Geometry** Unit 3: Plane sections of conicoids, Generating lines **MATH1051: Graph Theory:** The adjacency matrix, incidence matrix	4 4	**Theory** CC7: **Numerical Methods** Unit 5: The algebraic eigenvalue problem: Power method. Unit 6: Ordinary Differential Equations: The method of successive approximations **Practical** CC7: **Numerical Methods Lab** Unit 7: 3. Interpolation : Lagrange Interpolation 4. Numerical Integration (a) Trapezoidal Rule **Theory** SEC1: **Logic** Unit 1: Predicates and quantifiers: Introduction	3+1 5+3 4	**Theory** CC11: **Partial Differential Equations and Applications** Unit 3: Non-Homogeneous Wave Equation, Method of separation of variables: Solving the Vibrating String Problem. Solving the Heat Conduction Problem. **CC12: Mechanics I** Unit 3: Principal axes, D'Alembert's Principle, Motion about a fixed axis, Compound pendulum.	4+4 6+2	
Dec	**MATH1011: Geometry:** Classification of quadrics **MATH1051: Graph Theory:** Weighted graph	3+1 3+1	**Theory** CC7: **Numerical Methods** Unit 6: Euler's method, the modified Euler method, Runge-Kutta methods of orders two and four. **Practical** CC7: **Numerical Methods Lab** Unit 7: 4. Numerical Integration (b) Simpson's one third rule 5. Solution of ordinary differential equations : Runge Kutta method **Theory** SEC1: **Logic** Unit 1: Quantifiers, Binding variables and Negations	2+2 4 2+1	**Theory** CC11: **Partial Differential Equations and Applications: Graphical Demonstration :** 4. Solution of wave equation $$\frac{\partial^2 u}{\partial t^2} - \frac{\partial^2 u}{\partial x^2} = 0$$ for the following associated conditions: (a) $u(x,0) = f(x)$, $ux\,(x,0) = y(x)$, $x\hat{I}R$, $t > 0$. (b) $u(x,0) = f(x)$, $ux\,(x,0) = y(x), u(0,\,t) = 0$ $x\hat{I}\,(0,¥)$, $t > 0$. 5. Solution of wave equation $$\frac{\partial^2 u}{\partial t^2} - c^2 \frac{\partial^2 u}{\partial x^2} = 0$$ for the following associated conditions: (a) $u(x,0) = f(x)$, $u\,(0,\,t) = a, u\,(l,\,t) = b$, $0 < x < l$, $t > 0$. (b) $u(x,0) = f(x)$, $x\hat{I}R$, $0 < t < T$. **CC12: Mechanics I** Unit 3: Motion of a system of particles, Motion of a rigid body in two dimensions under finite and impulsive forces, Conservation of momentum and energy.	5+2 4+2	
Jan	**Sem-II (H)**		**Sem-IV (H)**		**Sem-VI (H)**		
	MATH2051: Programming in C: Introductions, Basic structure, Character set, Keywords, Identifiers variable –type declaration, Operators, arithmetic	8+2	**Theory** CC9: **Multivariate Calculus** Unit 3: Vector operators, Gradient of a scalar function, directional derivatives. **Theory** SEC2: **Graph Theory**	3	**Theory** DSE4: **Mechanics-II** Unit 1: Interpretation of Newton's laws of motion, Galilean transformation, Concept of absolute length and time.	8	

	expression…input and output statements.		Unit 1: Definition, examples and basic properties of graphs.	**4**	**Project Work PW01:**	**2**
Feb	**MATH2051: Programming in C:** Decision making (Branching and looping)	**8+2**	**Theory CC9: Multivariate Calculus** Unit 3: Definition of vector field, divergence and curl, Line integrals.	**5**	**Theory DSE4: Mechanics-II** Unit 1: Limitations of Newton's laws in solving problems.	**7+1**
			Theory SEC2: Graph Theory Unit 1: Pseudo graphs. complete graphs, Bi-partite graphs isomorphism of graphs.	**6**	**Project Work PW01:**	**12**
Mar	**MATH2051: Programming in C:** Array variables, string handling with arrays and string handling functions	**6+3**	**Theory CC9: Multivariate Calculus** Unit 3: Fundamental theorem for line integrals, conservative vector fields, Application of line integral to Workdone.	**2+2**	**Theory DSE4: Mechanics-II** Unit 3: Constraints and their classifications, Lagrange's equation of motion for holonomic system.	**10**
			Theory SEC2: Graph Theory Unit 2: Eulerian circuits, Eulerian graph, semi-Eulerian graph and theorems.	**7**	**Project Work PW01:**	**8**
Apr	**MATH2051: Programming in C:** User define functions their types, nesting of functions and recursion	**6+3**	**Theory CC9: Multivariate Calculus** Unit 4: Green's theorem, surface integrals.	**4**	**Theory DSE4: Mechanics-II** Unit 3: Gibbs-Appell's principle of least constraint.	**8**
			Theory SEC2: Graph Theory Unit 2: Hamiltonian cycles and theorems, Representation of a graph by a matrix, the adjacency matrix, incidence matrix, weighted graph.	**8**	**Project Work PW01:**	**12**
May	**MATH2051: Programming in C:** Structure: declaration, initialization, different structures.	**6+3**	**Theory CC9: Multivariate Calculus** Unit 4: Integrals over parametrically defined surfaces. Stoke's theorem.	**4**	**Theory DSE4: Mechanics-II** Unit 3: Work energy relation for constraint forces of shielding friction	**7**
			Theory SEC2: Graph Theory Unit 3: Travelling salesman's problem, shortest path, Tree and their properties, spanning tree.	**8**	**Project Work PW01:**	**10**
June	**MATH2051: Programming in C:** Pointers: declaration , initialization, application of pointers.	**6+3**	**Theory CC9: Multivariate Calculus** Unit 4: The Divergence theorem.	**2+2**	**Theory DSE4: Mechanics-II** Unit 1 & 3: Revision of Mechanics – II.	**4**
			Theory SEC2: Graph Theory Unit 3: Dijkstra's algorithm, Warshall algorithm.	**7**	**Project Work PW01:**	**6**

Head of the Department,
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TEACHING PLAN OF DR. PRASENJIT SAHA
Mathematics (Honours) (2023-24) (July 2023 – June 2024)

Month	Sem-I (H)	No. of Lecture	Sem-III (H)	No. of Lecture	Sem-V (H)	No. of Lecture
Jul	**MATH1011: Vector Calculus:** Triple product of vectors, Vector function: limit and continuity	**6+1**	**CC07: Numerical Methods Unit 1:** Algorithms, Convergence, Errors: Relative, Absolute. Round off, Truncation **CC07: Numerical Methods Lab (Practical)**	**2+1** **4**	**CC11: Partial Differential Equations and Applications Unit 1:** Basic concepts and Definitions. Mathematical Problems. First-Order Equations: Classification, Construction and Geometrical Interpretation. Method of Characteristics for obtaining General Solution of Quasi Linear Equations.	**18+2**
Aug	**MATH1011: Vector Calculus:** Vector function: differentiation and partial differentiation **MATH1051: Graph Theory:** Travelling salesman problem, shortest path	**4** **2+1**	**CC07: Numerical Methods Unit 2:** Transcendental and Polynomial equations: Bisection method, Newton's method, Secant method **CC07: Numerical Methods Lab (Practical)**	**3+2** **4**	**CC11: Partial Differential Equations and Applications Unit 1:** Canonical Forms of First-order Linear Equations. Method of Separation of Variables for solving first order partial differential equations. **Unit 2:** Derivation of Heat equation, Wave equation and Laplace equation	**12+2** **6+2**
Sept	**MATH1011: Vector Calculus:** Gradient of scalar function, Divergence of vector function	**4**	**CC07: Numerical Methods Unit 2:** Regula falsi method, fixed point iteration, Newton-Raphson method. Rate of convergence of these methods	**3+2**	**CC11: Partial Differential Equations and Applications Unit 2:** Classification of second order linear equations as	**14+2**

Month	MATH1011/1051		CC07: Numerical Methods		CC11: Partial Differential Equations	
	MATH1051: Graph Theory: Tree and their properties, Spanning Tree.	**3+1**	**CC07: Numerical Methods Lab (Practical)**	**4**	hyperbolic, parabolic, elliptic. Reduction of second order Linear Equations to canonical forms	
Oct	**MATH1011: Vector Calculus:** Curl of vector function	**2**	**CC07: Numerical Methods** Unit 3: System of linear algebraic equations: Gaussian Elimination and Gauss Jordan methods. Gauss Jacobi method	**4+2**	**CC11: Partial Differential Equations and Applications** Unit 3: The Cauchy problem of 2nd order partial differential equation, Cauchy-Kowalewskaya theorem, Cauchy problem of an infinite string, Initial and Boundary Value Problems.	**12+2**
	MATH1051: Graph Theory: Dijkstra's algorithm and Warshall algorithm	**2**	**CC07: Numerical Methods Lab (Practical)**	**4**		
Nov	**MATH1011: Vector Calculus:** Tutorial	**3**	**CC07: Numerical Methods** Unit 3: Gauss Seidel method and their convergence analysis, LU Decomposition	**4+2**	**CC11: Partial Differential Equations and Applications** Unit 3: Semi-Infinite String with a fixed end, Semi-Infinite String with a Free end. Equations with non-homogeneous boundary conditions. Non-Homogeneous Wave Equation	**14+2**
	MATH1051: Graph Theory: Planer and non planer graph, Eulers formula	**3+1**	**CC07: Numerical Methods Lab (Practical)**	**4**		
					Graphical Demonstration	**4**
Dec	**MATH1051: Graph Theory:** Colouring of graph	**3+2**	**CC07: Numerical Methods** Unit 4: Ordinary Differential Equations: The method of successive approximations, Euler's method, the modified Euler method, Runge-Kutta methods of orders two and four	**5+2**	**CC11: Partial Differential Equations and Applications** Unit 3: Method of separation of variables: Solving the Vibrating String Problem. Solving the Heat	**10+2**

			CC07: Numerical Methods Lab (Practical)	**4**	Conduction Problem	
			Group discussions and evaluation	**2**	**Graphical Demonstration**	**4**
					Group discussions and evaluation	**2**

	Sem-II (H)		Sem-IV (H)		Sem-VI (H)	
Jan	**MATH2011: Number Theory:** Well ordering principle, Pigeon-hole principle, Division algorithm	**7+1**	**CC09: Multivariate Calculus** **Unit 1:** Functions of several variables, limit and continuity, Partial differentiation, total differentiability and differentiability, sufficient condition for differentiability	**12+2**	**DSE43: Mechanics-II** **Unit 2:** Equilibrium of fluid in a given field of force **PW01: Project Work**	**6+2** **8**
Feb	**MATH2011: Number Theory:** Gretest common divisior, Euclidean algorithm, least common multiple	**7+1**	**CC09 Multivariate Calculus** **Unit 1:** Chain rule for one and two independent parameters, directional derivatives	**14+2**	**DSE43: Mechanics-II** **Unit 2:** Pressure in a heavy homogeneous liquid **PW01: Project Work**	**6+2** **8**
Mar	**MATH2011: Number Theory:** Linear Diophantine equation, Prime numbers	**7+1**	**CC09 Multivariate Calculus** **Unit 1:** The gradient, Jacobian, maximal and normal property of gradient, tangent planes	**14+2**	**DSE43: Mechanics-II** **Unit 2:** Equilibrium of floating bodies, Isothermal and adiabatic changes in Gases **PW01: Project Work**	**6+2** **8**
Apr	**MATH2011: Number Theory:** Fundamental theorem of arithmetic and its applications	**7+1**	**CC09 Multivariate Calculus** **Unit 1:** Extrema of functions of n variables with necessary and sufficient conditions, method of Lagrange multipliers	**14+2**	**DSE43: Mechanics-II** **Unit 2:** Convective equilibrium **PW01: Project Work**	**6+2** **8**

Month						
May	**MATH2011: Number Theory:** Perfect square and square free integers	6+1	**CC09 Multivariate Calculus** **Unit 2:** Double integration over rectangular region, double integration over non-rectangular region, Double integrals in polar co-ordinates	12+2	**DSE43: Mechanics-II** **Unit 2:** Stress in continuum body **PW01: Project Work** .	6+2 8
June	**MATH2011: Number Theory:** Tutorial	4	**CC09 Multivariate Calculus** **Unit 2:** Triple integrals, Triple integral over a parallelepiped and solid regions. Volume by triple integrals, cylindrical and spherical coordinates. Change of variables in double integrals and triple integrals Group discussions and evaluation	10+2 2	**DSE43: Mechanics-II** **Unit 2:** Stress quadric **PW01: Project Work** Group discussions and evaluation	6+2 8 2

Head of the Department,
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TEACHING PLAN OF SUJOY DAS
Mathematics (Honours) (2023-24) (July 2023 – June 2024)

Month	SEM-I (H)	No. of Lectures	SEM-III (H)	No. of Lectures	SEM-V(H)	No. of Lectures
July	**MATH1011, Calculus:** Indeterminate Form, L'Hospital's Rule	4	**Paper-CC-05, Unit -1:** Limits of functions (ε - δ approach), sequential criterion for limits, divergence criteria. Limit theorems, one sided limits.	6+6	**Paper-DSE-11, Unit -1:** Introduction to linear programming problem. Theory of simplex method, ,	5+6
August	**MATH1011, Calculus:** Concavity of curves, points of inflexion	4	**Paper-CC-05, Unit -1:** Infinite limits and limits at infinity. Continuous functions, sequential criterion for continuity and discontinuity.	7+6	**Paper-DSE-11, Unit -1:** graphical solution, convex sets, optimality and unboundedness	6+4
Sept	**MATH1011, Calculus:** Envelopes	4	**Paper-CC-05, Unit -1:** Algebra of continuous functions. Continuous functions on an interval, intermediate value theorem,	6+4	**Paper-DSE-11, Unit -1**The simplex algorithm	6+4
Oct	**MATH1011, Calculus:** Asymptotes	2	**Paper-CC-05, Unit -1:** Location of roots theorem, preservation of intervals theorem. Uniform	6+4	**Paper-DSE-11, Unit -1:** Simplex method in tableau format	5+4

			continuity, non-uniform continuity criteria, theorems on uniform continuity.			
Nov	**MATH1011, Calculus:** Curve tracing in Cartesian coordinate, tracing in polar coordinates of standard curves.	4	**Paper-CC-05, Unit -4:** Metric spaces: Definition and examples. Open and closed balls, neighbourhood, Open set, interior of a set. Limit point of a set, closed set, diameter of a set, subspaces,	6+8	**Paper-DSE-11, Unit -4:** Games with mixed strategies, graphical solution procedure,.	10+6
Dec	**MATH1011, Calculus:** Tutorial	3	**Paper-CC-05, Unit -4:** Dense sets, separable spaces.	4+2	**Paper-DSE-11, Unit -4:** linear programming solution of games.	5+2
	SEM-II (H)		**SEM-IV(H)**		**SEM-VI(H)**	
Jan	**MATH2011, Number Theory:** Congruences	4	**Paper-CC-08, Unit -3:** Pointwise and uniform convergence of sequence of functions. Theorems on Continuity, derivability and integrability of the limit function of a sequence of functions.	8+4	**Paper-CC-13, Unit -1:** Metric spaces: Sequences in Metric Spaces, Cauchy sequences. Complete Metric Spaces, Cantor's theorem.	5+5
Feb	**MATH2011, Number Theory:** Binary and decimal representation of numbers	4	**Paper-CC-08, Unit -3:** Series of functions, Theorems on the continuity and derivability of the sum function of a series of functions; Cauchy criterion for uniform convergence and Weierstrass M-Test.	8+4	**Paper-CC-13, Unit -2:** Continuous mappings, sequential criterion and other characterizations of continuity, Uniform continuity, Connectedness, connected subsets of R.	6+4
Mar	**MATH2011, Number Theory:** Chinese remainder theorem, Fermet's little theorem, Willson's theorem	4	**Paper-CC-08, Unit -3:** Fourier series: Definition of Fourier coefficients and series, Riemann-Lebesgue lemma, Bessel's inequality, Parseval's identity, Dirichlet's condition. Examples of Fourier expansions and summation results for series.	9+4	**Paper-CC-13, Unit -2:** Compactness: Sequential compactness, Heine-Borel property, Totally bounded spaces,	6+4
Apr	**MATH2011, Number Theory:** Sum of two squres, Arithmetic function $\varphi(n)$	4	**Paper-CC-08, Unit -3:** Power series, radius of convergence, Cauchy Hadamard Theorem. Differentiation and integration of power series; Abel's Theorem; Weierstrass Approximation Theorem.	8+4	**Paper-CC-13, Unit -2:** finite intersection property, and continuous functions on compact sets.	6+4
May	**MATH2011, Number Theory:** Arithmetic function $d(n), \sigma(n)$.	3	**Paper-CC-10, Unit -3:** Vector spaces, subspaces, algebra of subspaces, quotient spaces, linear combination of vectors, linear span, linear independence, Basis and dimension, dimension of subspaces, extension,	9+6	**Paper-CC-13, Unit -2:** Homeomorphism, Contraction mappings, Banach Fixed point Theorem	5+6
Jun	**MATH2011, Number Theory:** Tutorial	3	**Paper-CC-08, Unit -3:** Deletion and replacement theorems.	3+2	**Paper-CC-13, Unit -2:** Application of Banach Fixed point Theorem to ordinary differential equation Project Work	2+8

Head of the Department,
Department of Mathematics
Suri Vidyasagar College

TEACHING PLAN OF SOUMI DAS
Mathematics (Honours) (2023-24) (July 2023 – June 2024)

Month	Sem-I (H)	No. of Lecture	Sem-III (H)	No. of Lecture	Sem-V (H)	No. of Lecture
Jul	**MATH1011, Calculus:** Hyperbolic functions	4	**Theory** **CC05:Theory of Real Functions** Unit 2: Differentiability of a function at a point and in an interval,Caratheodorystheorem,algebra of differentiable functions	8+2	**Theory:DSE11:Linear Programming** Unit 2:Duality,Formulation of dual problem	8+4
			Theory **SEC1: Set** Unit2:Sets,Subsets,set operations and the laws of set theory and Venn diagrams	3		
Aug	**MATH1011, Calculus:** Higher order derivatives	4	**Theory** **CC05:Theory of real function** Unit02:Relative extrema,interiorextremum,Rollest heorem,Mean value theorem	7+1	**Theory** **DSE11:Linear Programming** Unit 2:Primal dual relationships,economic interpretation of the dual,Dual simplex method	9+2
			Theory **SEC1: Set** Unit 2:Examples of finite and infinite sets,Finite sets and counting principle	3		
Sept	**MATH1011, Calculus:** Leibnitz rule and its applications	4	**Theory** **CC05:Theory of real function** Unit2:Intermediate value property of derivatives,Darbouxtheorem,Applications of mean value theorem to inequalities and approximation of polynomials	8+3	.**Theory** **DSE11:Linear Programming** Unit 2:Transportation problem and its mathematical formulation,north west corner method,least cost method	8+2
			Theory **SEC1:Set** Unit 2:Empty set and property of empty set,Standard set operations,Classes of sets,power of a set	3		
Oct	**MATH1011, Calculus:** Leibnitz rule and its applications	2	**Theory** **CC05:Theory of real functions** Unit2:Application of differential calculas,Curvature	3	**Theory** **DSE11:Linear Programming** Unit 3:Vogel approximation method for determination of starting basic solution	3
			Theory **SEC 1:Set** Unit 3:Difference and symmetric	2		

			difference of two sets,Set identities			
Nov	MATH1011, Calculus: Tutorial	3	**Theory** **CC05:Theory of Real functions** Unit 3:Cauchy's mean value theorem,Taylor's theorem with Lagrange's form of remainder,Taylors theorem with Cauchy's form of remainder,Application of Taylor's theorem to convex functions,relativeextrema	10+2	**Theory** **DSE11:Linear Programming** Unit 3:Algorithm for solving transportation problem,assignmentproblem,and its mathematical formulation	10+2
			Theory **SEC1: Set** Unit 3:Generalized union and intersections,Relation,Productset, Compositionof relations,Type of relations	2+1		
Dec	MATH1011, Calculus: Tutorial	2	**Theory** **CC05:Theory of real functions** Unit 3:Taylor's series and Maclaurin's series expansions of exponential and trigonometric functions,Application of Taylor's theorem to inequalities	8+1	**Theory** **DSE11:Linear Programming** Unit3:Hungarian method for solving assignment problem,Travelling salesman proble	8
			Theory **SEC1:Set** Unit 3:Partitions,Equivalence Relatipns with examples of congruence modulo relation,Partial ordering relations,n -ary relation	3		
	Sem-II (H)		**Sem-IV (H)**		**Sem-VI (H)**	
Jan	Math2011: Algebra: Complex Number: De Moivre's theorem and its application	4	**Theory** **CC08:Riemann Integration and series of functions** Unit1:Riemann integration,inequalities of upper and lower sumsDarbouxintegration,Darboux theorem	8	Theory:CC13:Complex Analysis Unit 3:Limits,Limits involving the point at infinity,continuity,properties of complex numbers	8+4
Feb	Math2011: Algebra: Theory of equations, Relation between roots and coefficients	4	**Theory** **CC08:Riemann integration and series of functions** Unit1:Riemann conditions of integrability,Riemann sum and definition of Riemann integral through Riemann sums,equivalence of two definitions	8+3	**Theory** **CC13:Complex Analysis** Unit3:,regions in the complex plane,functions of complex variable ,mappings,derivatives,differentiation formulas	7+4

Mar	**Math2011: Algebra:** Transformation of equations, Descarte's rule of signs	4	**Theory CC08:Riemann integration and series of functions** Unit 1:Riemann integrability of monotone and continuous functions,Properties of riemannintegral,definition and integrability of piecewise continuous and monotone functions	6+4	**Theory:CC13:Coplex Analysis** Unit 3: Cauchy -Riemann equations,sufficient conditions for differentiability,analyticfunctions, example of analytic functions,exponential functions	10+2
Apr	**Math2011: Algebra:** Cubic and bi-quardatic equations	4	**Theory CC08:Riemann integration and series of functions** Unit 1:Intermediate Value theorem for integrals,Fundamentaltheorem of integral calculas	8+4	**Theory:CC13:Complex Analysis:** Logarithmic function,trigonometricfunction,Derivatives of functions,definite integrals of functions,contours	10+1
May	**Math2011: Algebra:** Separation of roots of equations, Strum's theorem	3	**Theory CC908:Riemann integration and series of functions** Unit2:Improper integrals	6+3	**Theory:CC13:Complex Analysis:Unit4:**contour integrals and its examples, upper bounds for moduli of contour integrals,Cauchy-Goursat theorem	8+2
June	**Math2011: Algebra:** Inequality	3+1	**Theory CC08:Riemann integration and series of functions** Unit 2:Beta and Gamma function.	4+3	**Theory:CC13:Complex Analysis:Unit 4:** Unit4:Cauchy integral formula and Revision of complex analysis	4

Head of the Department,
Department of Mathematics,
Suri Vidyasagar College

DEPARTMENT OF MICROBIOLOGY

TEACHING PLAN OF AMARNATH CHATTOPADHYAY
Microbiology (Honours) (2023-24) (July 2023 – June 2024)

Month	Sem-I (H)	No. of Lecture	Sem-III (H)	No. of Lecture	Sem-V (H)	No. of Lecture
Jul	**Theory:** **Major:** **Introduction to Microbiology and Microbial Diversity** Unit1: History and Development of Microbiology	8	**Theory** **CC5: Microbial Physiology & Metabolism** Unit 1: Microbial Growth and Effect of Environment on Microbial Growth	10	**Theory** **CC11: Industrial Microbiology** Unit 3: Types of fermentation processes, bio-reactors	10
	SEC1: Microbiological analysis in health care Unit 4: Testing for Antibiotic Sensitivity of Bacteria	4	**Practical** **CC5: Microbial Physiology & Metabolism** Study of growth curve of *E. coli* by turbidometric method, standard plate count method, Direct count method by phase contrast microscopy	6	**Practical** **CC11: Industrial Microbiology** Demonstration of different parts of a typical fermenter	4
	Minor: Introduction & Scope of Microbiology Unit 1: History & Development of Microbiology	4	**Theory** **SEC1: Microbial Diagnosis in Health Clinics** Unit 3 Direct Microscopic Examination and Culture	3	**DSE1: Microbes in Sustainable Agriculture** Enumeration of bacterial load of barren and fertile soil	4
	Practical **Major: Introduction to Microbiology and Microbial Diversity** Microbiology Laboratory Management and Bio-safety	2				
	To study the principle and applications of instruments (autoclave, incubator, hot air oven, centrifugation, light microscope, pH meter) used in the microbiology laboratory	4				
Aug	**Theory:** **Major:** **Introduction to Microbiology and Microbial Diversity** Unit2: Microscopy	8	**Theory** **CC6:Cell Biology** Unit 2: Nucleus	8	**Theory** **CC12: Immunology** Unit 4: Antibodies Unit 5: Major Histocompatibility Complex	8 / 4
	SEC1: Microbiological analysis in health care Unit 4: Testing for Antibiotic Sensitivity of Bacteria	4	**Practical** **CC5: Microbial Physiology & Metabolism** Calculation of generation time and specific growth rate of bacteria from the graph plotted with the given data	2	**Practical** **CC12: Immunology** Total Leukocyte Count of the given blood sample	4
	Minor: Introduction & Scope of Microbiology Unit 1: History & Development of Microbiology	4	**CC6:Cell Biology** Effect of temperature on growth of *E. coli*	2	Differential Leukocyte Count of the given blood sample (demonstration)	4
	Practical **Major: Introduction to Microbiology and Microbial Diversity** Sterilization of glassware using Hot Air Oven	2	**Theory** **SEC1: Microbial Diagnosis in Health Clinics** Unit 3 Direct Microscopic Examination and Culture	3		
	Preparation of culture media (Nutrient Broth, Nutrient Agar and Potato dextrose agar) for bacterial cultivation	4				

Month	Theory/Practical (Major/Minor/SEC)	Hrs	Theory/Practical (CC/SEC)	Hrs	Theory/Practical (DSE/CC)	Hrs
	Sterilization of medium using Autoclave and assessment for sterility	2				
Sept	**Theory:** **Major:** **Introduction to Microbiology and Microbial Diversity** Unit4: Introduction to Biomolecules Carbohydrates Amino acids & proteins	6 2	**Theory** **CC5: Microbial Physiology & Metabolism** Unit 4:Chemoheterotrophic Metabolism- Anaerobic respiration and fermentation	5	**.Theory** **DSE2: Instrumentation and Biotechniques** Unit 2 Chromatography	10
	Minor: Introduction & Scope of Microbiology Unit 1: History & Development of Microbiology Unit 3: Microscopy	2 2	**Practical** **CC5: Microbial Physiology & Metabolism** Determination of the thermal death point of *E. coli* **CC6: Cell Biology** Study of a representative plant (epidermal cell of *Rheo* sp.) and animal cell (squamous epithelial cell) by microscopy	2 4	**Practical** **DSE1: Microbes in Sustainable Agriculture** Study soil profile (Water holding capacity, pH, total organic carbon content) **CC11: Industrial Microbiology** Field Visit	6 4
	Practical **Major: Introduction to Microbiology and Microbial Diversity** Isolation and enumeration of bacteria from air, water and soil Qualitative estimation of Carbohydrate- Glucose	6 2	**Theory** **SEC1: Microbial Diagnosis in Health Clinics** Unit 6: Testing for Antibiotic Sensitivity in Bacteria	4		
	SEC1: Microbiological analysis in health care Antibiotic sensitivity assay (agar cup diffusion method, disc diffusion method)	4				
Oct	**Theory:** **Major:** **Introduction to Microbiology and Microbial Diversity** Unit4: Introduction to Biomolecules Amino acids & proteins	4	**Theory** **CC7: Molecular Biology** Unit 2: Replication of DNA (Prokaryotes and Eukaryotes)	5	**Theory** **DSE1: Microbes in Sustainable Agriculture** Unit 6 GM crops	6
	Minor: Introduction & Scope of Microbiology Unit 3: Microscopy	2	**Practical** **CC6: Cell Biology** Study of different stages of Mitosis from permanent slide	2	**Practical** **CC11: Industrial Microbiology** Microbial fermentations for the production and estimation (qualitative and quantitative) of : Alcohol: Ethanol	4
	Practical **Major:** **Introduction to Microbiology and Microbial Diversity** Qualitative estimation of Carbohydrate- Starch	2	**Theory** **SEC1: Microbial Diagnosis in Health Clinics** Unit 4: Serological and Molecular Methods	3	**CC12: Immunology** Identification of human blood groups	2
	SEC1: Microbiological analysis in health care Determination of MIC of streptomycin for *E. coli*	2				
Nov	**Theory:** **Major:** **Introduction to Microbiology and Microbial Diversity** Unit4: Introduction to Biomolecules Lipids Nucleic Acids	5 1	**Theory** **CC7: Molecular Biology** Unit 2: Replication of DNA (Prokaryotes and Eukaryotes) Unit 6: Regulation of gene Expression	5	**Theory** **CC11: Industrial Microbiology** Unit 2: Isolation of industrially important microbial strains and fermentation media	9
	SEC1: Microbiological analysis in health care Unit 3: Serological and Molecular Methods	3	**Practical** **CC7: Molecular Biology** Isolation of genomic DNA from *E. coli*	5	**CC12: Immunology** Unit 8: Immunological Techniques	4

Month						
	Minor: Introduction & Scope of Microbiology Unit 3: Microscopy	3	Theory SEC1: Microbial Diagnosis in Health Clinics Unit 4: Serological and Molecular Methods	3	Practical DSE2: Instrumentation and Biotechniques Separation of mixtures of amino acids and sugars by paper chromatography	4
	Practical Major: Introduction to Microbiology and Microbial Diversity Qualitative estimation of Amino acids (Ninhydrin test)	2			Separation of mixtures of amino acids and sugars by thin layer chromatography	4
	Study of *Rhizopus*, *Aspergillus* and *Agaricus* from permanent slides	2				
Dec	Theory: Major: Introduction to Microbiology and Microbial Diversity Unit4: Introduction to Biomolecules Nucleic Acids Special Classes, Doubt clearance	3 / 2	Theory CC7: Molecular Biology Unit 6: Regulation of gene Expression Special classes for doubt clearance	2 / 2	Theory CC12: Immunology Unit 8: Immunological Techniques	2
	SEC1: Microbiological analysis in health care Unit 3: Serological and Molecular Methods Special Classes, Doubt clearance	2 / 1	Practical CC7: Molecular Biology Resolution and visualization of DNA by Agarose Gel Electrophoresis	5	DSE2: Instrumentation and Biotechniques Unit 5 Centrifugation Special Classes	6 / 2
	Minor: Introduction & Scope of Microbiology Unit 3: Microscopy Special Classes, Doubt clearance	3 / 1	Theory SEC1: Microbial Diagnosis in Health Clinics Special classes for doubt clearance Question Answer session	2	Practical DSE2: Instrumentation and Biotechniques Demonstration of density gradient centrifugation with the help of pictures Practice Classes	2 / 2
	Practical Major: Introduction to Microbiology and Microbial Diversity Study of *Anabaena, Volvox, Zygnema* and *Spirogyra* from permanent slides	2				
	Study of Paramecium, *Euglena, Amoeba* and *Plasmodium* from permanent slides	2				
	Practice Classes	2				
	Sem-II (H)		**Sem-IV (H)**		**Sem-VI (H)**	
Jan	Theory Major: Bacteriology Unit 2: Culture Techniques	4	Theory CC8: Microbial Genetics Unit 2: Plasmids CC9: Environmental Microbiology Unit 3: Biogeochemical Cycling	8 / 2	Theory CC13: Medical Microbiology Unit 4: Viral diseases DSE4: Bio-safety and Intellectual Property Rights Unit 2 : Biosafety Guidelines	8 / 6
	SEC2: Biofertilizers and Biopesticides Unit 1: Biofertilizers	2	Practical CC8: Microbial Genetics Preparation of master plates and replica Plates Study of the effect of physical (UV) mutagens on bacterial cells	4 / 2	Practical CC13: Medical Microbiology Study of bacterial flora of skin by swab method	2
	Minor: Basic Bacteriology Unit 2: Bacteriological culture techniques	2	Theory SEC2: Food fermentation Techniques Unit 1 Fermented Foods.	2	DSE3: Advances in Microbiology Demonstration of PCR amplification of	3
	Practical Major: Bacteriology Preparation of different media: synthetic media, Complex media	4				

Month					metagenomic DNA using universal 16S ribosomal gene primers	
Feb	**Theory** **Major: Bacteriology** Unit 1: Cell Organization	8	**Theory** **CC9: Environmental Microbiology** Unit 3: Biogeochemical Cycling	6	**Theory** **CC14: Recombinant DNA Technology** Unit 1: Introduction to Genetic Engineering	4
	SEC2: Biofertilizers and Biopesticides Unit 1: Biofertilizers	4	**CC10: Food and Dairy Microbiology** Unit 1: Foods as a substrate for microorganisms	6	**DSE4: Bio-safety and Intellectual Property Rights** Unit 5: Patent	4
	Minor: Basic Bacteriology Unit 2: Bacteriological culture techniques Unit 3: Nutrition	2 2	**Practical** **CC9: Environmental Microbiology** Isolation of microbes (bacteria &fungi) from rhizosphere and rhizoplane	4	**Practical** **DSE3:** Demonstration of PCR amplification of metagenomic DNA using universal 16S ribosomal gene primers	3
	Practical **Major: Bacteriology** Preparation of different media: Differential and Selective media	4	**Theory** **SEC2: Food fermentation Techniques** Unit 1 Fermented Foods	2	**CC14:** Designing of primers for DNA amplification	4
Mar	**Theory** **Major: Bacteriology** Unit 1: Cell Organization Unit 3: Nutrition	2 6	**Theory** **CC10: Food and Dairy Microbiology** Unit 4: Fermented foods (Probiotic) **CC8: Microbial Genetics** Unit 3: Mechanisms of Genetic Exchange	2 6	**Theory** **DSE4: Bio-safety and Intellectual Property Rights** Unit 5: Patent **CC14: Recombinant DNA Technology** Unit4: DNA Amplification and DNA sequencing	4 4
	SEC2: Biofertilizers and Biopesticides Unit 1: Biofertilizers	4	**Practical** **CC10: Food and Dairy Microbiology** MBRT of milk samples Isolation of spoilage microorganisms from spoiled carrot	4 4	**Practical** **CC14:** Interpretation of sequencing gel electrophoretograms	4
	Minor: Basic Bacteriology Unit 3: Nutrition	4			**DSE4: Bio-safety and Intellectual Property Rights** Filing primary applications for patents	4
	Practical **Major: Bacteriology** Determination of CFU by spread plate method/pour plate method	6	**Theory** **SEC2: Food fermentation Techniques** Unit 6 Probiotic Foods	2		
Apr	**Theory** **Major: Bacteriology** Unit 5: Growth & Reproduction in Bacteria	6	**Theory** **CC8: Microbial Genetics** Unit 3: Mechanisms of Genetic Exchange **CC9: Environmental Microbiology** Unit 5: Microbial Bioremediation	4 4	**Theory** **CC14: Recombinant DNA Technology** Unit4: DNA Amplification and DNA sequencing **CC13: Medical Microbiology** Unit 5: Protozoan diseases	4 6
	SEC2: Biofertilizers and Biopesticides Unit 1: Biofertilizers	4	**Practical** **CC9: Environmental Microbiology** Analysis of soil - pH, moisture content, water holding capacity	6	**DSE3:** Unit 3 Molecular Basis of Host-Microbe Interactions	4
	Minor: Basic Bacteriology Unit 4: Growth & Reproduction in Bacteria	4			**Practical** **CC13: Medical Microbiology** Perform antibacterial sensitivity by Kirby-Bauer method	2
	Practical **Major: Bacteriology** Isolation of pure cultures of bacteria by streaking method	4	**Theory** **SEC2: Food fermentation Techniques** Unit 6 Probiotic Foods Unit 5 Fermented Meat and Fish	3 3	**DSE4: Bio-safety and Intellectual Property Rights** Study of steps of a patenting process	4
May	**Theory** **Major: Bacteriology** Unit 4: Control of Microorganisms	6	**Theory** **CC9: Environmental Microbiology** Unit 5: Microbial Bioremediation	4	**Theory** **DSE3:** Unit 3 Molecular Basis of Host-Microbe Interactions	8

	Minor: Basic Bacteriology Unit 4: Growth & Reproduction in Bacteria	2	**CC10: Food and Dairy Microbiology** Unit 7: Rapid detection methods of food borne pathogens in foods	6	**CC14: Recombinant DNA Technology** Unit 5: Applications of Recombinant DNA Technology	2
	Practical **Major: Bacteriology** Preservation of bacterial cultures (slant /stab)	4	**Practical** **CC9: Environmental Microbiology** Isolation of *Rhizobium* from root nodules	2	**Practical** **CC13: Medical Microbiology** Identify bacteria (*E. coli, Staphylococcus, Bacillus*) using laboratory strains on the basis of cultural, morphological and biochemical characteristics: IMViC	4
	SEC2: Biofertilizers and Biopesticides Isolation of Rhizobium from root nodules of leguminous plants and identification by phenotypic characteristics	4	**CC10: Microbial Genetics** Demonstration of Bacterial Conjugation through audiovisual teaching aids	2	**DSE4: Bio-safety and Intellectual Property Rights** A case study	6
			Theory **SEC2: Food fermentation Techniques** Unit 5 Fermented Meat and Fish	3		
June	**Theory** **Major: Bacteriology** Special classes Doubt clearance	2 2	**Theory** **CC10: Food and Dairy Microbiology** Unit 7: Rapid detection methods of food borne pathogens in foods Special class and Doubt Clearance	2 4	**Theory** **CC14: Recombinant DNA Technology** Unit 5: Applications of Recombinant DNA Technology Special classes, Question answer session, Doubt Clearance	6 2
	SEC2: Biofertilizers and Biopesticides Special classes, Doubt clearance	2	**Practical** **CC10: Food and Dairy Microbiology** Demonstration of cultivation of edible mushroom (*Pleurotus* sp) Practice Classes	2 2	**Practical** **CC13: Medical Microbiology** Study using permanent mounts: stages of malarial parasite in RBCs Practice Classes	2 2
	Minor: Basic Bacteriology Special classes, Doubt clearance	2	**Theory** **SEC2: Food fermentation Techniques** Special classes	2		
	Practical **Major: Bacteriology** Practice classes	4				
	SEC2: Biofertilizers and Biopesticides Study of Mycorrhizal fungi from plant samples	2				

Amarnath Chattopadhyay

Signature of the Teacher
Department of Microbiology
Suri Vidyasagar College

DEPARTMENT OF MICROBIOLOGY

TEACHING PLAN OF RAMKRISHNA ROY
Microbiology (Honours) (2023-24) (July 2023– June 2024)

Month	Sem-I (H)	No. of Lecture	Sem-III (H)	No. of Lecture	Sem-V (H)	No. of Lecture
Jul	**Theory:** **Major: Introduction to Microbiology and Biomolecules** Unit 3: Diversity of Microbial World	4	**Theory** **CC5: Microbial Physiology and Metabolism** Unit 5: Chemolithotrophic and Phototrophic Metalism	8	**Theory** **CC12: Immunology** Unit 3: Antigen	8
	SEC 1: Microbiological analysis in health care Unit 1: Collection of Clinical Samples	3	**Practical** **CC5: Microbial Physiology and Metabolism** Effect of pH on growth of *E. coli*	2	**Practical** **CC12: Immunology** Immunodiffusion by Ouchterlony method.	4
	Minor: Introduction &Scope of Microbiology Unit 2: Diversity of Microorganisms (System of Classification)	4	**Theory** **SEC1: Microbial Diagnosis inHealth Clinics** Unit: 1: Importance of Diagnosis of Disease	4	**Theory** **DSE 1: Microbes in Sustainable Agriculture** Unit 1: Soil Microbiology	6
	Practical **Minor: Introduction &Scope of Microbiology** 1. Microbiology laboratory management and Bio-safety	2			**Practical** **DSE 1: Microbes in Sustainable Agriculture** Isolation of Cellulose degrading organisms using CMC as substrate	2
	2. Principle and Application of instruments: Autoclave, Hot air oven, Light Microscope,	2				
Aug	**Theory:** **Major: Introduction to Microbiology and Biomolecules** Unit 3: Diversity of Microbial World General characteristics and economic importance of different group of Microbes: Cellular microorhanisms)	6	**Theory** **CC6: Cell Biology** Unit 5: Cell Cycle and Cancer Eukaryotic Cell Cycle and its Regulation. Mitosis and Meiosis	4	**Theory** **CC12: Immunology** Unit 6: Complement System	6
	SEC 1: Microbiological analysis in health care Unit 1: Collection of Clinical Samples	3	**Practical** **CC6: Cell Biology** Study of different stages of Meiosis from Permanent slide	2	**Practical** **CC12: Immunology** DOT ELISA	4
	Minor: Introduction &Scope of Microbiology Unit 2: Diversity of Microorganisms (General characteristics and economic importance of different group of Microbes: Cellular microorhanisms)	6	**Theory** **SEC1: Microbial Diagnosis inHealth Clinics** Unit 2: Collection of Clinical Samples (How to collect clinical sample)	4	**DSE 1: Microbes in Sustainable Agriculture** Preparation of Rhizobium as soil inoculants and application	4
	Practical **Minor: Introduction &Scope of Microbiology** 2. Principle and Application of instruments: Incubator, Centrifuge, pH meter, Laminar air flow	2				
	8. Study of *Rhizopus, Aspergillus,* and *Agaricus* from permanent slide	2				
	SEC 1: Microbiological analysis in health care 1. Gram staining	2				

Month		Hrs		Hrs		Hrs
Sept	**Theory:** **Major: Introduction to Microbiology and Biomolecules** Unit 3: Diversity of Microbial World General characteristics and economic importance of different group of Microbes (Acellular entity)	4	**Theory** **CC6: Cell Biology** Unit 5: Cell Cycle and Cancer Development of Cancer, causes of Cancer.	4	**Theory** **CC11: Industrial Microbiology** Unit 1: Introduction to Industrial Microbiology	4
	SEC 1: Microbiological analysis in health care Unit 2: Direct Microscopic Examination and Culture. (Examination of Sample by Staining)	3	**Theory** **CC7:Molecular Biology** Unit3:Transcription in Prokaryotes and Eukaryotes, Transcription: Definition, Promoter, RNA Polymerase, Transcription unit,	6	Unit 4: Down – stream processing	9
	Minor: Introduction & Scope of Microbiology Unit 2: Diversity of Microbial World General characteristics and economic importance of different group of Microbes:(Acellular entity)	4	**Practical** **CC7: Molecular Biology** Estimation of DNA and its purity check and estimation of Protein by using UV Spectrophotometer.	2	**Practical** **CC11: Industrial Microbiology**	4
	Practical **Minor: Introduction to Microbiology and Biomolecules** 3. Preparation of Culture Media	2	**Theory** **SEC1: Microbial Diagnosis inHealth Clinics.** Unit 2: Collection of Clinical Samples. (Method of transport of clinical samples to laboratory and storage.)	2	INDUSTRIAL VISIT	
	9. Study of *Anabaena, Volvox, Zygnema* and *Spirogyra* from permanent slides	2				
Oct	**Theory:** **SEC 1: Microbiological analysis in health care** Unit 2: Direct Microscopic Examination and Culture. (Preparation and use of culture media)	3	**Theory** **CC7: Molecular Biology** Unit 3: Transcription in Prokaryotes and Eukaryotes, Transcription in Eukaryotes.	2	**Theory** **DSE 2: Instrumentation and Biotechniques** Unit 4: Electrophoresis	5
	Minor: Introduction & Scope of Microbiology Unit 4: Introduction to Biomolecules Carbohydrates	2	**CC7: Molecular Biology** Unit 4: Post- Transcriptional Processing	4	**Practical** **DSE 2: Instrumentation and Biotechniques**	
	Practical: **Minor: Introduction & Scope of Microbiology** 4. Sterilization of medium using Autoclave	2	**Practical** **CC6: Cell Biology** Study of Polyploidy in Onion Root tip by Colchicine Treatment.	4	Demonstration of Column packing in gel filtration chromatography.	2
	SEC 1: Microbiological analysis in health care 2. Preparation of Culture Media	2				
Nov	**Theory:** **SEC 1: Microbiological analysis in health care** Unit 5: Microbiological Analysis of Water	4	**Theory** **CC7: Molecular Biology** Unit 4: Post- Transcriptional Processing. RNA interference: si RNA and mi RNA.	2	**Theory** **DSE 2: Instrumentation and Biotechniques** Unit 4: Electrophoresis	5
	Minor: Introduction & Scope of Microbiology Unit 4: Introduction to Biomolecules Carbohydrates	4	**CC5: Microbial Physiology and Metabolism.** Unit 2: Nutrient uptake and Transport.	6	**Practical** **DSE 2: Instrumentation and Biotechniques**	
	Practical **Minor: Introduction & Scope of Microbiology** 5. Sterilization of glassware using Hot Air Oven	2	**Practical** **CC5: Microbial Physiology and Metabolism.**	2	Separation of Proyein mixtures by Polyacrylamide Gel Electrophoresis(PAGE)	4
	6. Sterilization of heat sensitive material by Filtration	2	Effect of different concentration of glucose on groeth of *E. coli*			
	11. Qualitative estimation of Carbohydrates and Amino Acids	4				
	SEC 1: Microbiological analysis in health care 5. MPN test	4				

Month						
			Theory		**Theory**	
Dec	**Theory:** **SEC 1: Microbiological analysis in health care** Unit 5: Microbiological Analysis of Water	2	**CC5: Microbial Physiology and Metabolism** Unit 5: Chemolithotrophic and Phototrophic Metalism (Revision class)	4	**DSE1: DSE 1: Microbes in Sustainable Agriculture** Unit 2: Microbial Activity in Soil and Green House Gases	6
	Practical **Minor: Introduction & Scope of Microbiology** 7. Isolation and enumeration of bacteria from Air, Water and Soil	4				
	10. Study of *Paramecium, Euglena, Amoeba* and *Plasmodium* from permanent slides	2				
	Special classes + doubt clearing+ discussions **Practical** Practice classes					

	Sem-II (H)		**Sem-IV (H)**		**Sem-VI (H)**	
Jan	**Theory** **Major : Bacteriology** Unit 6: Bacterial Systematics	3	**Theory** **CC 9: Environmental Microbiology** Unit 4: Waste Management	8	**Theory** **CC 14: Recombinant DNA Technology**	
	SEC 2: Biofertilizers and Biopesticides Unit 2: Non-Symbiotic Nitrogen Fixer	4	**Practical** **CC 9: Environmental Microbiology**		. Unit 2: Molecular Cloning-Tools and Strategie	5
	Minor: Basic Bacteriology Unit 6: Bacterial Systematics	3	Isolation of Cellulose degrading microbes by enrichment culture technique.	2	**Theory**	
	Practical **Minor: Basic Bacteriology** 1. Preparation of different media: Synthetic media, Complex media, Differential and Selective media.	6	**Theory** **SEC2: Food Fermentation Techniques** Unit 2: Milk Based Fermented Foods	3	**DSE4: Biosafety and Intellectual property Rights.** Unit 1: Bio-safety: Introduction; Biosafety issues in Biotechnology	2
Feb	**Theory** **Major : Bacteriology** Unit6: Bacterial Systematics	4	**Theory** **CC10: Food and Dairy Microbiology** Unit 4: Fermented Food	4	**Theory** **CC14: Recombinant DNA Technology .** Unit 2: Molecular Cloning-Tools and Strategies.	5
	SEC 2: Biofertilizers and Biopesticides Unit 3: Phosphate Solubilizers	4	**Practical** **CC10: Food and Dairy Microbiology**	2	**Practical** **CC14: Recombinant DNA Technology .**	
	Minor: Basic Bacteriology Unit 6: Bacterial Systematics	4	Study of Micriorganisms from dahi.		Demonstration of Southern Blotting.	2
	Practical **Minor: Basic Bacteriology** 2. Simple Staining 3. Negative Staining	2 2	**Theory** **SEC2: : Food Fermentation Techniques** Unit 2: Milk Based Fermented Foods	3	**Theory** **DSE4: Biosafety and Intellectual property Rights**	
	SEC 2: Biofertilizers and Biopesticides 2. Isolation of free living nitrogen fixing bacteria especially *Azotobacter* and *Azospirillum* study of their diagnostic characters	4			Unit 1: Biological safety cabinets and their types; Primary containment for Biohazards;	2

Month						
Mar	Theory **Major : Bacteriology** Unit7: Important Archaeal & Bacterial Groups	4	Theory **CC10: Food and Dairy Microbiology** Unit 4: Fermented Food	4	Theory **CC14: Recombinant DNA Technology .** Unit 2: Molecular Cloning-Tools and Strategies.	2
	SEC 2: Biofertilizers and Biopesticides Unit 4: Mycorrhizal Biofertilizer	4			**CC 13: Medical Microbiology** Unit 6: Fungal Diseases	5
	Minor: Basic Bacteriology Unit7: Important Archaeal & Bacterial Groups	4	Practical **CC10: Food and Dairy Microbiology.** Isolation of Spoilage Microorganisms from bread.	4	Practical **CC 13: Medical Microbiology** Determination of Minimal Inhibitory Concentration(MIC) of Antibiotics	2
	Practical **Minor: Basic Bacteriology** 4. Gram Staining 5. Endospore Staining	2 2	**CC 9: Environmental Microbiology** Assessment of microbiological quality of water by MPN test	2	Theory **DSE4: Biosafety and Intellectual property Rights** Unit 6: Agreements and Treaties	8
	SEC 2: Biofertilizers and Biopesticides 5.Isolation of *Bacillus thuringiensis*	2	Theory **SEC2: Food Fermentation Techniques** Unit 3: Grain Based Fermented Foods	5		
Apr	Theory **Major : Bacteriology** Unit7: Important Archaeal and Bacterial groups	4	Theory **CC 8: Microbial Genetics** Unit 5: Transposable Elements	8	Theory **CC13: Medical Microbiology** Unit 7: Antimicrobial agents: Source, General characteristics and mode of action	8
	SEC 2: Biofertilizers and Biopesticides Unit 5: Bio-Pesticides	3	Practical **CC 8: Microbial Genetics** Isolation of Plasmid DNA from E. coli	4	Practical **CC13: Medical Microbiology** Identify bacteria(E. coli, Staphylococcus, Bacillus) using laboratory strains on the basis of culture, morphological and biochemical characteristics: Urease production Catalase test	2
	Minor: Basic Bacteriology Unit7: Important Archaeal and Bacterial groups	4	Theory **SEC2: Food Fermentation Techniques** Unit 4: Vegetable Based Fermented Foods	5		
	Practical **Minor: Basic Bacteriology** 6. Isolation of pure cultures of bacteria by streaking methods	4			**DSE4: Biosafety and Intellectual property Rights** Study of components and design of a BSL-III laboratory using audio- visual aids	2
	7. Preservation of bacterial cultures (Slant/ Stab)	4				2
May	Theory **SEC 2: Biofertilizers and Biopesticides** Unit 5: Bio-Pesticides	4	Theory **CC 10: Food and Dairy Microbiology** Unit 2: Microbial Spoilage of various foods.	8	Theory **DSE 3: Advances in Microbiology** Unit 1: Evolution of Microbial Genomes	8
	Practical **Minor: Basic Bacteriology** 8. Determination of CFU by spread plate method/ pour plate method	6			Unit 2: Metagenomics	5
	SEC 2: Biofertilizers and Biopesticides 6. Cultivation of Virus	2	Practical **CC 8: Microbial Genetics** Study of different conformation of plasmid DNA through Agarose gel electrophoresis using DNA ladder	4	Practical **CC14: Recombinant DNA Technology** Digestion of DNA using Restriction enzyme and analysis by agarose gel Electrophoresis	2
					DSE 3: Advances in Microbiology Extraction of metagenomic DNA from soil	6

	Theory		Theory		Theory	
June	Special class Mock Test	2	**CC10: Food and Dairy Microbiology** Special class	2	**DSE 3: Advances in Microbiology** Unit 2: Metagenomics	5
			Practical **CC10 : Food and Dairy Microbiology** **and** **CC 9 : Environmental Microbiology** [Repeat practical Class]	2 2	**Practical** **CC14: Recombinant DNA Technology** Determination of molecular size of DNA fragment by agarose gel Electrophoresis Quantification and purity checking of Extracted metagenomic DNA.	4 4

Ramkrishna Roy.

Signature of Teacher
Department of Microbiology
Suri Vidyasagar College

Teaching Plan of Dr. Abhijit Sen

Physics Hons 2023-2024 (01.07.2023-30.06.2024)

Month	Sem I	Sem III	Sem V
July'2023	Recapitulation: Limits, continuity, average and instantaneous quantities, differentiation. Plotting functions. Intuitive ideas of continuous, differentiable, etc. functions and plotting of curves. Approximation: Taylor and binomial series.	Some Special Integrals: Beta and Gamma Functions and Relation between them. Expression of Integrals in terms of Gamma Functions. Error Function (Probability Integral).	Linear Vector Spaces: Abstract Systems. Binary Operations and Relations. Introduction to Groups and Fields. Vector Spaces and Subspaces. Linear Independence and Dependence of Vectors. Basis and Dimensions of a Vector Space. Change of basis. Homomorphism and Isomorphism of Vector Spaces. Linear Transformations. Algebra of Linear Transformations. Non-singular Transformations. Representation of Linear Transformations by Matrices.
August'2023	First Order and Second Order Differential equations: First Order Differential Equations and Integrating Factor. Homogeneous Equations with constant coefficients. Wronskian and general solution. Statement of existence and Uniqueness Theorem for Initial Value Problems.Particular Integral.	Theory of Errors: Systematic and Random Errors. Propagation of Errors. Normal Law of Errors. Standard and Probable Error. Least-squares fit. Error on the slope and intercept of a fitted line. Partial Differential Equations: Solutions to partial differential equations, using separation of variables.	Matrices: Addition and Multiplication of Matrices. Null Matrices. Diagonal, Scalar and Unit Matrices. Upper-Triangular and Lower-Triangular Matrices. Transpose of a Matrix. Symmetric and Skew-Symmetric Matrices. Conjugate of a Matrix. Hermitian and Skew- Hermitian Matrices. Singular and Non-Singular matrices. Orthogonal and Unitary Matrices. Trace of a Matrix. Inner Product.
September'2023	Calculus of functions of more than one variable: Partial derivatives, exact and inexact differentials. Integrating factor, with simple illustration. Constrained Maximization using Lagrange Multipliers.	Laplace's Equation in problems of rectangular, cylindrical and spherical symmetry. Wave equation and its solution for vibrational modes of a stretched string, rectangular and circular membranes. Diffusion Equation.	Eigen-values and Eigenvectors. Cayley- Hamiliton Theorem. Diagonalization of Matrices.Solutions of Coupled Linear Ordinary Differential Equations.Functions of a Matrix.
October'2023	Independent random variables: Probability distribution functions; binomial, Gaussian, and Poisson, with examples. Mean and variance. Dependent events: Conditional Probability. Bayes' Theorem and the idea of hypothesis testing.	Introduction to Scilab, Advantages and disadvantages, Scilab environment, Command window, Figure window, Edit window, Variables and arrays, Initialising variables in Scilab, Multidimensional arrays, Subarray, Special values, Displaying output data, data file, Scalar and array operations, Hierarchy of operations, Built in Scilab functions, Introduction to plotting, 2D and 3D plotting (2), Branching Statements and program design, Relational & logical operators, the while loop, for loop, details of loop operations, break & continue statements, nested loops, logical arrays and vectorization (2) User defined functions, Introduction to Scilab functions, Variable passing in Scilab, optional arguments, preserving data between calls to a function, Complex and Character data, string function, Multidimensional arrays (2) an introduction.	Cartesian Tensors: Transformation of Co-ordinates. Einstein's Summation Convention. Relation between Direction Cosines. Tensors. Algebra of Tensors.Sum, Difference and Product of Two Tensors. Contraction. Quotient Law of Tensors.Symmetric and Anti-symmetric Tensors. Invariant Tensors: Kronecker and Alternating Tensors. Association of Antisymmetric Tensor of Order Two and Vectors. Vector Algebra and Calculus using Cartesian Tensors; Scalar and Vector Products, Scalar and Vector Triple Products.
November'2023	Definition of Dirac delta function. Representation as limit of a Gaussian function and rectangular function. Properties of Dirac delta function.	Ohms law to calculate R, Hooke's law to calculate spring constant. Solution of mesh equations of electric circuits (3 meshes) Solution of coupled spring mass systems. Generating and plotting Legendre polynomials. Generating and plotting Bessel function. First order differential equation	Differentiation. Gradient, Divergence and Curl of Tensor Fields. Vector Identities. Tensorial Formulation of Analytical Solid Geometry: Equation of a Line. Angle Between Lines. Projection of a Line on another Line. Condition for Two Lines to be Coplanar. Foot of the

		• Radioactive decay • Current in RC, LC circuits with DC source • Newton's law of cooling • Classical equations of motion.	Perpendicular from a Point on a Line. Rotation Tensor (No Derivation). Isotropic Tensors. Tensorial Character of Physical Quantities. Moment of Inertia Tensor. Stress and Strain Tensors. Symmetric Nature. Elasticity Tensor. Generalized Hooke's Law.
December'2023	Introduction to Programming, constants, variables and data types, operators and Expressions, I/O statements, scanf and printf, cin and cout, Manipulators for data formatting, Control statements (decision making and looping statements) (If statement. If else Statement. Nested if Structure. Else if Statement. Ternary Operator. Goto Statement. Switch Statement. Unconditional and Conditional Looping. While Loop. Do-While Loop. For Loop. Break and Continue Statements. Nested Loops), Arrays (1D & 2D) and strings, user defined functions, Structures and Unions, Idea of classes and objects	Second order Differential Equation Harmonic oscillator (no friction) Damped Harmonic oscillator Over damped Critical damped Oscillatory Forced Harmonic oscillator. Transient and Steady state solution Apply above to LCR circuits.	General Tensors: Transformation of Co-ordinates. Makowski Space. Contravariant & Covariant Vectors. Contravariant, Covariant and Mixed Tensors. Kronecker Delta and Permutation Tensors. Algebra of Tensors. Sum, Difference & Product of Two Tensors. Contraction. Quotient Law of Tensors.Symmetric and Anti-symmetric Tensors.Metric Tensor.
	Sem II	**Sem IV**	**Sem VI**
January'2024	Plane and Spherical Waves. Longitudinal and Transverse Waves. Plane Progressive (Travelling) Waves. Wave Equation. Particle and Wave Velocities.	Complex Analysis: Brief Revision of Complex Numbers and their Graphical Representation. Euler's formula, De Moivre's theorem, Roots of Complex Numbers. Functions of Complex Variables.	Detector for Nuclear Radiations: Gas detectors: estimation of electric field, mobility of particle, for ionization chamber and GM Counter.
February'2024	Differential Equation. Pressure of a Longitudinal Wave. Energy Transport. Intensity of Wave. Water Waves: Ripple and Gravity Waves.	Analyticity and Cauchy-Riemann Conditions. Examples of analytic functions. Singular functions: poles and branch points, order of singularity, branch cuts. Integration of a function of a complex variable.	. Basic principle of Scintillation Detectors and construction of photo-multiplier tube (PMT). Semiconductor Detectors (Si and Ge) for charge particle and photon detection (Concept of charge carrier and mobility), neutron detector
March'2024	Velocity of Transverse Vibrations of Stretched Strings. Velocity of Longitudinal Waves in a Fluid in a Pipe. Newton"s Formula for Velocity of Sound.Laplace"s Correction.	Cauchy's Inequality. Cauchy's Integral formula. Simply and multiply connected region. Laurent and Taylor's expansion. Residues and Residue Theorem. Application in solving Definite Integrals.	Particle Accelerators: Accelerator facility available in India: Van-de Graaff generator (Tandem accelerator), Linear accelerator, Cyclotron, Synchrotrons.
April'2024	Standing (Stationary) Waves in a String: Fixed and Free Ends. Analytical Treatment. Phase and Group Velocities. Changes with respect to Position and Time. Energy of Vibrating String. Transfer of Energy. Normal Modes of Stretched Strings.	*Scilab/C++ based simulations experiments based on Mathematical Physics problems like* 1. Solve differential equations: dy/dx = e-x with y = 0 for x = 0 dy/dx + e-xy = x2 d2y/dt2 + 2 dy/dt = -y d2y/dt2 + e-tdy/dt = -y	Particle physics: Particle interactions; basic features, types of particles and its families. Symmetries and Conservation Laws: energy and momentum, angular momentum, parity, baryon number, Lepton number, Isospin, Strangeness and charm, concept of quark model, color quantum number and gluons.
May'2024	Plucked and Struck Strings. Melde"s Experiment. Longitudinal Standing Waves and Normal Modes. Open and Closed Pipes. Superposition of N Harmonic Waves.	Dirac Delta Function: Evaluate(x+3) dx, for =1, 0.1, 0.01, and show it tends to 5. Fourier Series: , Evaluate the Fourier coefficients of a given periodic function (square wave), Frobenius method and Special functions:	Astronomical Scales: Astronomical Distance, Mass and Time, Scales, Brightness, Radiant Flux and Luminosity, Measurement of Astronomical Quantities Astronomical Distances, Stellar Radii, Masses of Stars, Stellar Temperature. Basic concepts of positional astronomy: Celestial Sphere, Geometry of a Sphere, Spherical Triangle, Astronomical Coordinate Systems, Geographical Coordinate Systems, Horizon System, Equatorial System, Diurnal Motion of the Stars, Conversion of Coordinates. Measurement of Time,

			Sidereal Time, Apparent Solar Time, Mean Solar Time, Equation of Time, Calendar. Basic Parameters of Stars: Determination of Distance by Parallax Method; Brightness, Radiant Flux and Luminosity, Apparent and Absolute magnitude scale, Distance Modulus; Determination of Temperature and Radius of a star; Determination of Masses from Binary orbits; Stellar Spectral Classification, Hertzsprung-Russell Diagram.
June'2024	Principle of Holography. Recording and Reconstruction Method. Theory of Holography as Interference between two Plane Waves. Point source holograms.	Calculation of least square fitting manually without giving weightage to error. Confirmation of least square fitting of data through computer program. Evaluation of trigonometric functions e.g. sin θ, Given Bessel's function at N points find its value at an intermediate point. Complex analysis: Integrate $1/(x2+2)$ numerically and check with computer integration.	Astronomical techniques: Basic Optical Definitions for Astronomy (Magnification Light Gathering Power, Resolving Power and Diffraction Limit, Atmospheric Windows), Optical Telescopes (Types of Reflecting Telescopes, Telescope Mountings, Space Telescopes, Detectors and Their Use with Telescopes (Types of Detectors, detection Limits with Telescopes). Physical principles: Gravitation in Astrophysics (Virial Theorem, Newton versus Einstein), Systems in Thermodynamic Equilibrium.

Teaching Plan of Sri Kalan Mal

Physics Hons 2023-2024(01.07.2023-30.06.2024)

Month	Sem I	SemIII	SemV
July	Idea of vectors, properties, examples and problem solving	2nd order differential equations and problems solve	Failure of classical mechanics in explaining photoelectric effect, Black-body radiation and specific heat of solids, origin of quantum mechanics,
August	Vector identities, differential operators, Idea of divergence, Gradient, problems solved	Fourier series expansion, Evaluation of Fourier co-efficient, problems solve, Fourier transform of trigonometric, Gaussian, finite wave and other functions.	Wave-particle duality, De Boglie hypothesis, Uncertainty principle, Application of uncertainty principle for nonexistence of electron in the nulceous.
September	Vector integration, line integration, Surface integration, Volume integration, related theorems	Laplace Transform, Change of scale theorem, Application of Laplace Transforms to 2nd order differential equations.	Problems solution on Uncertainty principle and wave particle duality.
October	Differential equations: 1st order linear differential equations, University previous years questions solve	Brief revision of the topics taught in the previous classes and problem solve with university questions solutions.	Failure of Newtonian mechanics in explaining quantum mechanical phenomenon, idea of wave function and its properties.
November	Orthogonal curvilinear co-ordinates, Derivation of Gradient, Divergence and curl, Laplacian in general form and in special co-ordinate form.	Frobenious method and special functions, Bessel and Hermite differential equation their solution in power series. Bessel function and their recurrence relations	Time dependent Schrodinger equations and dynamical evolution of a quantum state, interpretation of wave function, Probability and probability current density.
December	Definition of the Dirac Delta function, Properties of Dirac Delta function and problems and revision.	Hermite function and their solution in power series. Bessel function and their recurrence relations	Physical acceptability of a function to be wave-function, Eigen function and Eigen values
	Sem II	Sem IV	SemVI
January	Gauss theorem, Proof and its applications with problems solve, Dielectric properties of matter	Black body radiation, Quantum theory of light, Photo-electric effect and Compton effect with derivations.	Normalization of wave function, Problems on normalization, probability and probability current density.
February	Idea of polarization, its classifications, Gauss's laws in the presence of dielectric, relation between D, P, E vectors.	Wave-particle duality, De Boglie hypothesis, Uncertainty principle, Application of uncertainty principle for nonexistence of electron in the nulceous.	Time independent Schrodinger Equation, Stationary states and energy eigen-value, Concept of wave packet, Gaussian wave packet.
March	Magnetic field, Biot -Savart law with application in different cases.	Double slit experiment with photon, Matter wave and wave amplitude, Schrodinger equation for non-relativistic particles,	Position -momentum uncertainty principle, Quantum theory of hydrogen like atom.
April	Ampere's cicuital law,vector potential, Torque on current carring loop,	Interpretation of wave function, Probability and probability current density in one dimension.	Space quantization, Electron Spin and spin angular momentum, stern -Gerlach experiment.
May	Electromagnetic Induction, Faraday law, Lents Law, Self-Inductance and mutual inductance, Idea of displace current, Introduction to Maxwell's equations.	One dimensional infinite rigid box, Quantum dot as an example, Quantum mechanical scattering and tunneling.	Problems solve and class tests
June	Balistic Galvanometers, Torque on a current loop, Current and charge sensitivity of Ballistic galvanometer, Electromagnetic damping of Ballistic Galvanometer.	Radio activity, law of radio-activity decay,mean life and half life, Alpha decay, beta decay and prediction of neutrino.	University exam

TEACHING PLAN OF NIRMAL KUMAR DATTA
2023-2024 (July2023-June 2024)

Month	SEM-I (H)	Sem-III(H)	III(H)
Jul	Properties of vectors under rotations. Scalar product and its invariance under rotations. Vector product. Scalar triple product and their interpretation in terms of area and volume respectively. Scalar and Vector fields.	Some Special Integrals: Beta and Gamma Functions and Relation between them.	Probability Theory. Aim and scope of statistical mechanics. Phase space. μ-space and Γ-space. Phase trajectory. Ensembles. Time average and ensemble average. Principle of equal a priori probability. Microstates and macrostates. Statistical equilibrium. Microcanonical ensemble. Statistical definition of entropy. Entropy of a perfect gas.
Aug	Vector Differentiation: Directional derivatives and normal derivative. Gradient of a scalar field and its geometrical interpretation. Divergence and curl of a vector field. Del and Laplacian operators.	Expression of Integrals in terms of Gamma Functions. Error Function (Probability Integral	Sackur-Tetrode formula. Gibbs paradox. Law of equipartition of energy. Application to specific heat. Rotational specific heat of hydrogen. Ortho and para hydrogen. Brief discussion on vibrational specific heat of diatomic molecules.
Sept	Vector Integration: Ordinary Integrals of Vectors. Multiple integrals, Jacobian. surface and volume elements. Line, surface and volume integrals of Vector fields. Flux of a vector field. Gauss' divergence theorem, Green's and Stokes theorems and their applications	Problem solving + tutorial+ discussions and evaluation	Quantum statistics. Quantization of phase space. Symmetry of wave function of a system of identical particles. Connection with spin of the particles. Bosons and fermions. Effect of symmetry on counting. Examples illustrating counting procedure for MB, BE, and FD statistics. Derivation of distribution functions for the three statistics.
Oct	Problem solving + discussions and evaluation	Wind Energy harvesting: Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines.	Conditions under which BE and FD distributions reduce to MB distribution. Thermodynamic behaviour of an ideal Bose gas. BE condensation. Einstein and Debye's theories of the specific heat of solids.
Nov	Elasticity: Relation between Elastic constants. Twisting torque on a Cylinder or Wire.	Power electronic interfaces, and grid interconnection topologies.	Problem solving + tutorial+ discussions and evaluation
Dec	Do+ Problem solving + discussions and evaluation	Problem solving + tutorial+ discussions and evaluation	Classical theory of black body radiation. Kirchhoff's law. Stefan's law. Wien's displacement law. RayleighJeans formula for the spectral distribution of the energy of black body radiation. Equation of state of radiant energy.
	SEM-II(H)	**SEM-IV (H)**	
Jan	Faraday's Law. Lenz's Law. Self Inductance and Mutual Inductance.	Brief Revision of Complex Numbers and their Graphical Representation. Euler's formula, De Moivre's theorem, Roots of Complex Numbers.	Cavity radiation as a photon gas. Density of states of photons. Derivation of Planck's law by applying BE statistics. Energy density as functions of wavelength and frequency.
Feb	Reciprocity Theorem. Energy stored in a Magnetic Field.	Functions of Complex Variables. Analyticity and Cauchy-Riemann Conditions. Examples of analytic functions. Singular functions: poles and branch points, order of singularity, branch cuts.	Do
Mar	Introduction to Maxwell's Equation..	Integration of a function of a complex variable. Cauchy's Inequality. Cauchy's Integral formula.. Laurent and Taylor's expansion. Residues and Residue Theorem.	FD distribution function. Chemical potential and Fermi energy. Specific heat of electron gas in metals.
Apr	Do+ Problem solving + discussions	Problem solving + tutorial+ discussions and evaluation	Thermionic emission. Richardson-Dushman equation.
May	Charge Conservation and Displacement current.	Two slit interference experiment with photons, atoms and particles.	Problem solving + discussions and evaluation
Jun	Problem solving+ discussions and evaluation	One dimensional infinitely rigid box-energy eigenvalues and eigenfunctions, normalization.	Special Classes

Teaching Plan of Dr. Somnath Chowdhury

Physics (Honours) (2023-24) (July 2023-June 2024)

Month	SEM-I (H)	SEM-III (H)	SEM-V (H)
July 2023	Orthogonal Curvilinear Coordinates:Spherical and Cylindrical Coordinate Systems.	Theory of Errors: Systematic and Random Errors. Propagation of Errors.	Quantum theory of hydrogen-like atoms:
Aug	Introduction to probability.Probability distribution functions; binomial, Gaussian, and Poisson,	Normal Law of Errors. Standard and Probable Error. Least-squares fit.	Atoms in Electric & Magnetic Fields:
Sept	Dirac Delta function and its properties:	Partial Differential Equations: Solutions to partial differential equations, Problem solving	Spin Angular Momentum. Larmors' Theorem.
Oct	Non-inertial frames, fictitious forces, uniformly rotating frame, laws of Physics in rotating coordinate system	Digital Circuits: NAND and NOR Gates as Universal Gates.	Dielectric Properties of Materials:
Nov	Coriolis force and its application, cylindrical and spherical coordinate system	Boolean algebra: De Morgan's Theorems. Boolean Laws.	Ferroelectric Properties of Materials:
Dec	Problem solving, discussions, doubt t clearing	Data processing circuits: Basic idea of Multiplexers, De-multiplexers, Decoders, Encoders.	Classification of crystal: Problem solving, Assignment
	SEM II (H)	**SEM IV (H)**	**SEM-VI (H)**
Jan24	Wave optics, e.m. nature of light, definition and properties of wavefront, Huygens principle, temporal and spatial coherence		
Feb	Refraction. Deviation of amplitude and wavefront, Young's double slit expt., Lloyds mirror, Fresnel's biprism		
March	Problem solving, discussions, doubt clearing		
April	Phase change on reflection, Stokes treatment, interference in thin films, parallel and wedge shaped films, fringes of equal inclination, equal thickness,		
May	Newton ring, measurement of wavelength and refractive index		
June	Michelson interferometer, idea of form of fringes, determination of wavelength, refractive index, visibility of fringes, Fabry-Perot interferometer		

TEACHING PLAN OF SANJIB MONDAL
Physics (Honours) (2023-24) (July 2023-Mar 2024)

Month	SEM-I (H)	SEM-III (H)	SEM-V (H)
July 2023	Kinematics of Moving Fluids: Poiseuille''s Equation for Flow of a Liquid through a Capillary Tube. Gravitation and Central Force Motion: Law of gravitation. Gravitational potential energy.	Theory of Errors: Systematic and Random Errors. Propagation of Errors.	Quantum theory of hydrogen-like atoms:
Aug	Motion of a particle under a central force field.Two-body problem.	Normal Law of Errors.Standard and Probable Error. Least-squares fit.	Atoms in Electric & Magnetic Fields:
Sept	Problem solving, discussions, tutorial, doubt clearing	Partial Differential Equations: Solutions to partial differential equations, Problem solving	Spin Angular Momentum.Larmor''s Theorem.
Oct	Oscillations: SHM: Simple Harmonic Oscillations. Resonance, sharpness of resonance; power dissipation.	Digital Circuits:NAND and NOR Gates as Universal Gates.	Dielectric Properties of Materials:
Nov	Do	Boolean algebra: De Morgan's Theorems. Boolean Laws.	Ferroelectric Properties of Materials:
Dec	Problem solving, discussions, tutorial, doubt clearing	Data processing circuits: Basic idea of Multiplexers, De-multiplexers, Decoders, Encoders.	Classical Mechanics, Hamilton''s principle: Problem solving, Assignment
Jan-2024	**SEM II (H)**	**SEM IV (H)**	**SEM VI (H)**
	Electrical Circuits: AC Circuits: Kirchhoff''s laws for AC circuits.	Laplace Transform (LT) of Elementary functions.	Astronomical Scales:
Feb	Network theorems: Ideal Constant-voltage and Constant-current Sources.	Do, Assignment	Astronomical techniques:
March	Ballistic Galvanometer: Torque on a current Loop. Ballistic Galvanometer. Assignment,	Amplifiers: Transistor Biasing and Stabilization Circuits. Fixed Bias and Voltage Divider Bias.	The sun (Solar Parameters, Solar Photosphere, Solar Atmosphere)

TEACHING PLAN OF DR. SOUMYA RANJAN BHATTACHARYYA
Physics (Honours) (2023-24) (July 2023- June 2024)

Month	SEM-I (H)	SEM-III(H)	SEM- V(H)
Jul	Michelson Morley expt, outcomes, postulates of special theory, Lorentz transformation	Zeroth and first law of thermodynamics, extensive, intensive variables, thermodynamic equilibrium, concept of temperature, concept of work and heat	Crystal structure: solids- amorphous and crystalline materials, lattice translation vectors
Aug	Simultaneity, Lorentz contraction, time	First law of thermodynamics,	Lattice in a basis- central and non central

	dialation	internal energy, first law and various processes, applications of first law	elements
Sept	Relativistic transformation of velocities, frequency, wave number	General relation between Cp and Cv, work done during isothermal and adiabatic process, expansion coefficient	Unit cells, miller indices, reciprocal lattice, types of lattices, Brillouin zones, diffraction of X-rays by crystals, Bragg's law, atomic and geometrical factor
Oct	Problem solving + recapitulation + discussions and evaluation	Problem solving + tutorial+ discussions and evaluation	Problem solving + tutorial+ discussions and evaluation
Nov	Relativistic velocity addition, variation of mass, mass energy equivalence, massless particle, Doppler effect, Relativistic kinematics, energy momentum transformation	Second law of thermodynamics, concept of entropy, entropy of perfect gas, entropy of universe, principle of increase of entropy	Elementary band theory: Kronig-Penny model, band gap, conductor, semiconductor (P and N type) ad insulator
Dec	Do+ Problem solving + discussions and evaluation	Maxwell Boltzmann velocity distribution for ideal gas, mean, rms, most probable speed, degree of freedom, law of equipartition of energy + Problem solving + doubt clearing+ discussions and evaluation	Conductivity of semiconductor, mobility, Hall effect, measurement of conductivity and Hall coefficient + Problem solving + doubt clearing+ discussions and evaluation
	SEM-II(H)	**SEM-IV (H)**	**SEM-VI (H)**
Jan	Electric field and electric potential, electric field lines, electric flux	Planks quantum theory, light as a collection of photons, Photoelectric effect, Compton scattering, de Broglie wavelength and matter wave,	Classical statistics: macrostate and microstate, elementary concept of ensemble, phase space, entropy and thermodynamic probability
Feb	Gauss's law and applications + Problem solving on Gauss's law and electric field	Davidson-Germer experiment. Two slit experiment, probability and wave functions	Maxwell- Boltzmann distribution law, partition function, thermodynamic function of an ideal gas
Mar	Conservative nature of electrostatic field, electrostatic potential, Laplace's and Poisson's equation, electrical dipole	Position measurement- gamma ray microscope thought experiment, wave particle duality Problem solving + tutorial+ discussions and evaluation	Do + Problem solving + doubt clearing+ discussions and evaluation
Apr	Do+ Problem solving + discussions	Heisenberg uncertainty principle, Minimum energy of a confined particle using uncertainty principle, energy-time uncertainty	Classical entropy expression, Gibb's paradox, Sackur Tetrode equation
May	Capacitance, parallel plate capacitor, method of images and its application	Semiconductor diodes- P and N type, energy level diagram, conductivity and mobility, concept of drift velocity, static and dynamic resistance	Law of equipartition of energy, application of specific heat and its limitations, thermodynamic functions of two- energy level system
Jun	Do+ Problem solving+ discussions and evaluation	Current flow mechanism in forward and reverse biased diode, drift velocity, depletion region, barrier potential and current + Problem solving + doubt clearing+ discussions and evaluation	Do+ Problem solving + doubt clearing+ discussions and evaluation

Sd/-

Head of the Department,
Department of Physics,
Suri Vidyasagar College

TEACHING PLAN (Major/Hons. Minor/Gen/GE.and M.D.) OF FACULTY MEMBERS OF DEPARTMENT OF PHYSIOLOGY FOR SESSION 2023-2024

DEPARTMENT OF PHYSIOLOGY

TEACHING PLAN
DR. AMAL KUMAR PARI
Physiology (Major/Honours) (July 2023 – June 2024)

Month	Sem-I (Major)	No. of Lecture	Sem-III (H)	No. of Lecture	Sem-V (H)	No. of Lecture
Jul	**Theory:** **Course Code: PHSL1011** General concept of the basic anatomical organization of human body. Structure and Function of Cell Organelle – Plasma membrane, nucleus. **Practical:** **Course Code: PHSL1011** **Introduction on**: Principle, working procedure and function of different components of microscope. Introduction on permanent slides - Applied value. Study and identification of stained sections of different mammalian tissues and organs: tongue, oesophagus, stomach, small intestine, large intestine, liver, salivary glands.	6 8	**Theory** **CC6:** **Origin of the Heartbeat & the Electrical Activity of the heart** Introduction Origin & Spread Of Cardiac Excitation Cardiac action potential. Origin and propagation of cardiac impulse. The Electrocardiogram Electrocardiography –the normal electrocardiogram, electrocardiographic leads,vectorial analysis, the vectorcardiogram, the mean electrical axis of heart. The His bundle electrogram. Cardiac Arrhythmias Cardiac Arrhythmias – Normal cardiac rate. Myocardial Infarctions. Cardioplegic solutions. Electrocardiographic Findings in Other Cardiac & Systemic Diseases, hypertrophy and cardiac myopathy **Practical** **CC7:** Experiments on superficial (plantar) and deep (knee jerk) reflex Measurement of grip strength **Theory SEC1A: Detection of food additives/ adulterants** **Qualitative tests for Food Adulteration** Qualitative test for identifying Food Adulterants in some food samples: Metanil yellow, Rhodamin B, Saccharin.	8 4 3	**Theory** **CC11:** Introduction Anatomic Considerations The Image-Forming Mechanism (accommodation and visual acuity) The Photoreceptor Mechanism: Genesis of Electrical Responses Visual Pathways and effects of lesions of these pathways **Practical:** Measurement of blood pressure before and after different grades of exercise. Recording of recovery heart-rate after standard exercise. .	8 4

Month						
Aug	**Theory:** **Theory:** **Course Code: PHSL1011** **Structure and Function of Cell Organelle –** Plasma membrane, nucleus, mitochondria, ribosome, lysosome, Golgi body, endoplasmic reticulum, peroxisomes, cytoskeletal elements and centrosomes. **Practical:** **Course Code: PHSL1011** Study and identification of stained sections of different mammalian tissues and organs: pancreas, adrenal gland, thyroid gland, testes, ovary, uterus	8 4	**Theory** **CC6:** **The Heart as a Pump** Introduction Anatomy of the heart. Properties of cardiac muscle. Cardiac Innervation. Stannius ligature. Mechanical Events of the Cardiac Cycle The cardiac cycle- pressure and volume changes. Heart sounds. Murmurs. Cardiac Output Cardiac output– measurement by application of Fick's principle and dye dilution method, factors affecting. Starling's law of heart. **Dynamics of Blood & Lymph Flow** Introduction Anatomic Considerations Functional morphology of arteries, arterioles, capillaries, venules and veins, sinusoids. General pattern of circulation and significance of branching of blood vessels. Biophysical Considerations Hemodynamics of blood flow. Arterial & Arteriolar Circulation Capillary Circulation Lymphatic Circulation & Interstitial Fluid Volume Venous Circulation **Practical** **CC7:** Reaction time by stick drop test Short term memory test (shape, picture word) **Theory SEC1A:** Qualitative test for identifying FoodAdulterants in some food samples: Monosodium glutamate, Aluminium foil, Chicory.	9 4 4 3	**Theory** **DSE2B:** Color Vision Other Aspects of Visual Function Eye Movements Errors in visual process **Practical:** **DSE2B:** Determination of Physical Fitness Index by Harvard Step Test (Modified). Determination of VO2max by Queen College step test.	8 4
Sept	**Theory:** **Course Code: PHSL1011** Revision and Question Answer discussion **Practical:** **Course Code: PHSL1011** Study and identification of stained sections of different mammalian tissues and organs: Bone, trachea, lungs, spleen, lymph gland **SEC: Hematological Techniques** **Course Code: PHSL1051** Preparation of haemin crystals. Reticulocyte staining.	4 4 4	**Theory** **CC6:** **Cardiovascular regulatory Mechanisms** Introduction Local Regulatory Mechanisms Cardiac and vasomotor centers, baroreceptors and chemoreceptors, cardiac and vasomotor reflexes. Substances Secreted by the Endothelium Systemic Regulation by Hormones Systemic Regulation by the Nervous System Cardiovascular homeostasis–neural and chemical control of cardiac functions and blood vessels. **Circulation Through special Regions** Introduction Cerebral Circulation Anatomic Considerations Cerebrospinal Fluid The Blood-Brain barrier Cerebral Blood Flow Regulation of Cerebral Circulation Brain Metabolism & Oxygen Requirements **Practical** **CC7:** Two point discrimination test **Theory SEC1A:** Qualitative test for identifying FoodAdulterants in some food samples: Bisphenol A and Bisphenol S, Chocolate Brown HT, Margarine	8 2 3	**Theory** **DSE2B:** Importance of regular exercise in health and wellbeing. Basic concept of Bioenergetics, Energy sources during exercise (Phosphagen, Anaerobic system and Aerobic system). Cardio-respiratory responses during different grades of exercise. **Practical:** **DSE2B:** Measurement of body fat percentage. Six minute walk test.	8 4

Month	Sem-II (Major)		Sem-IV (H)		Sem-VI (H)	
Oct	**Theory:** **Course Code: PHSL1011** Revision and Assessment **Practical:** **Course Code: PHSL1011** Practice and Unknown Permanent Tissue section Identification, Class test **SEC: Hematological Techniques** **Course Code: PHSL1051** Blood group determination	6 2 2	**Theory** **CC6:** Coronary Circulation Splanchnic Circulation Circulation of the skin Placental & Fetal Circulation **Practical** **CC7:** **Practice** Experiments on superficial (plantar) and deep (knee jerk) reflex Measurement of grip strength **Theory** **SEC1A:** Qualitative test for identifying FoodAdulterants in some fo Pb, Hg, As, PCB, Dioxin etc in turmeric powder, besan, laddoood	8 4 3	**Theory** **.DSE2B:** Concept of excess post exercise oxygen consumption (EPOC), physiological fatigue and recovery. Aerobic work Capacity: Measurement, physiological factors and applications Sports injury and its' management. **Practical:** **DSE2B:** Determination of endurance time by hand grip dynamometer	6 4
Nov	**Theory:** **Course Code: PHSL1011** Revision **Practical:** **Course Code: PHSL1011** Practice of slide Identification **SEC: Hematological Techniques** **Course Code: PHSL1051** Practice	2 2 2	**Theory** **CC6: Cardiovascular Homeostasis in Health & Disease** Introduction Compensation for Gravitational Effects Exercise Inflammation & Wound Healing Shock Cardiovascular adjustment after haemorrhage. Hypovolemic and hypervolemic shock. RTI and atherosclerosis. Hypertension The pulse – arterial and venous. Blood pressure– its measurement and factors affecting. Heart Failure, stroke **Practical** **CC7:** **Practice** Two point discrimination test **Theory SEC1A:** Qualitative test for identifying FoodAdulterants in some fo Pb, Hg, As, PCB, Dioxin etc in , noodles, chocolate and amriti.	8 2 4	**Theory** **DSE2B:** Training: Principles of physical training, Training to improve aerobic and anaerobic power. Effect of overtraining and detraining. Nutritional supplements and ergogenic aids. Basic idea sports rehabilitation and sports medicine. **Practical:** **DSE2B:** Determination of endurance time by hand grip dynamometer	8 2
Dec	**Theory:** **Course Code: PHSL1011** Revision **Practical** Practice and Revision **Examination**	4 4	**Theory** **CC6:** **Revision** **Practical** **Practice** **Theory SEC1A:** **Revision** **Examination**	4 4 3	**Theory** **DSE2B:** **Revision** **Practical** **Practice** **Examination**	4 4
Jan	**Sem-II (Major)**		**Sem-IV (H)**		**Sem-VI (H)**	
	Theory **Course Code: PHSL2011** Plasma proteins - Origin, synthesis, classification and function. Blood volume and measurement of blood volume. **Practical:** **Course Code: PHSL2011** Preparation and staining of blood film with Leishman's stainand identification of blood cells. Differential count of WBC.	6 4	**Theory** **CC8:** Nutrition – BMR, RQ, RDA, SDA, NPU, Biological value of proteins, vitamins and minerals. **Practical:** **CC8:** Quantitative estimation of glucose and sucrose by Benedict's method. **Theory** **SEC2B:** Preparation of blood smear and identification of blood cells.	8 4 2	**Theory** **DSE3A:** Constituents of food and their significance. Basal metabolic rate -factors, determination by Benedict-Roth apparatus. Respiratory quotient. Specific dynamic action. Basic concept of energy and units. Calorific value of foods. Body calorie requirements – adult consumption unit **Practical:** **DSE3A:** **Diet Survey (Field Study Record)** Diet survey report (hand-written) of a family (as per ICMR specification): Each student has to submit a report on his/her own family.	8 4 2 4

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Month						
Feb	**Theory:** **Course Code: PHSL2011** Blood volume and Measurement of blood volume Formation circulation and function of Lymph **Practical:** **Course Code: PHSL2011** Determination of Bleeding time and Clotting time	6 4	**Theory** **CC8:** Basal metabolic rate-factors, determination by Benedict-Roth apparatus **Practical:** **CC8:** Quantitative estimation of amino nitrogen (Sorensen's formol titration method [percentage as well as total quantity to be done]). **Theory** **SEC2B:** Determination of hematocrit, MCV, MCH,MCHC	6	**Theory** **DSE3A:** Dietary requirements of carbohydrate, protein, lipid and other nutrients. Balanced diet and principles of formulation of balanced diets for growing child, adult man and woman, pregnant woman and lactating woman. Nitrogen balance, essential amino acids, biological value of proteins. Supplementary value of protein. Protein efficiency ratio and net protein utilization of dietary proteins. **Practical:** **DSE3A:** **Practice** **Diet Survey (Field Study Record)** Diet survey report (hand-written) of a family (as per ICMR specification): Each student has to submit a report on his/her own family.	10 4 2 2
Mar	**Theory:** **Course Code: PHSL2011** Revision and Question Answer discussion . **Practical:** **Course Code: PHSL2011** Preparation of haemin crystal. **Course Code: PHSL2051** Discussion on Alteration of lipid and thyroid profile in health and disease.	6 2 2	**Theory** **CC8:** Biological value of proteins – measurement and factors affecting. Proteins sparers. Supplementary value of protein. **Practical:** **CC8:** Estimation of percentage quantity of lactose in milk by Benedict's method. **Theory** **SEC2B:** Determination of bleeding time, clotting time	4 4 2	**Theory** **DSE3A:** Dietary fibres. Vitamins	8
Apr	**Theory** **Course Code: PHSL2011** Revision and Assessment **Practical:** **Course Code: PHSL2051** Discussion and Demonstration on Strength of solution: Normality and molarity with calculation. Discussion on Pathological significance of some enzymes and proteins: Lactate dehydrogenase, glucose-6-phosphate dehydrogenase, creatin kinase, amylase, ACP, ALP	6 6	**Theory** **CC8:** Protein efficiency ratio and net protein utilization of dietary proteins. **Practical:** **CC8:** Practice Quantitative estimation of glucose and sucrose by Benedict's method. **Theory** **SEC2B:** Measurement of hemoglobin in blood. Preparation of serum	4 4 2	**Theory** **DSE3A:** Principle of diet survey. Composition and nutritional value of common food stuffs. Physiology of starvation and obesity.	8
May	**Theory** **Course Code: PHSL2011** Revision **Practical:** **Course Code: PHSL2011** Practice	6 2	**Theory** **CC8:** Dietary fibres **Practical:** **CC8:** Practice Quantitative estimation of amino nitrogen (Sorensen's formol titration method [percentage as well as total quantity to be done]). **Theory** **SEC2B:** Estimation of SGOT and SGPT.	6 4 2	**Theory** **DSE4:** Sources and physiological significances of vitamins and minerals. Space nutrition.	8 4 4

June	**Theory** **Course Code: PHSL2011** Revision **Practical** **Course Code: PHSL2011** Practice **Examination**		**Theory** **CC8:** **Revision** **Practical** **Practice** **Theory** **SEC2B:** **Revision** **Examination**	**4** **4** **2**	**Theory** **DSE3A:** **Revision** **Practical** **Practice** **Examination**	**4** **4**

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DEPARTMENT OF PHYSIOLOGY

TEACHING PLAN
DR. AMAL KUMAR PARI
Physiology (Minor/General/generic) (July2023–June 2024)

Month	Sem-I (Minor)	No. of lecture
July	**Theory:** **Course Code: PHSL1021** General concept of the basic anatomical organization of human body. Structure and Function of Cell Organelle – Plasma membrane, nucleus.	2
Aug	**Theory:** **Course Code: PHSL1021** Structure and Function of Cell Organelle – mitochondria, ribosome, lysosome, Golgi body, endoplasmic reticulum, peroxisomes, cytoskeletal elements and centrosomes.	3
Sep	**Theory:** **Course Code: PHSL1021** Revision	2
Oct	**Theory:** **Course Code: PHSL1021** Revision	2
Nov	**Theory:** **Course Code: PHSL1021** Revision	2
Dec	**Theory:** **Course Code: PHSL1021** Examination	

Month	Sem-II (Minor)	No. of lecture	Sem-VI (G/GE)	No. of lecture
Jan	**Theory** **Course Code: PHSL2021** Plasma proteins - Origin, synthesis, classification and function. Blood volume and measurement of blood volume.	3	**Theory:** **SEC1A:** Basic idea of dopping	2
Feb	**Theory:** **Course Code: PHSL2021** Blood volume and Measurement of blood volume Formation circulation and function of Lymph	3	**Theory:** **SEC1A:** EMG	1
March	**Theory:** **Course Code: PHSL2021** Revision and Question Answer discussion.	3	**Theory:** **SEC1A:** Physical fitness index-Harvard step test	1
April	**Theory** **Course Code: PHSL2021** Revision and Assessment	2 2	**Theory:** **SEC1A:** ECG- Normal waves and leads	2
May	**Theory** **Course Code: PHSL2021** Revision	2	**Theory:** **SEC1A:** Anthropometry and its uses	1
June	**Theory** **Course Code: PHSL2021** Revision **Examination**	2	**Theory:** **SEC1A:** Revision Examination	2

Physiology (Multi Disciplinary) (July2023– June 2024)

Month	SEM –I (M.D : Nutrition and Dietetics)	No. of lecture
Jul	**Theory:** **Course Code:PHSL1031** Dietary fibers. Calorie requirement. Concept of ACU.	4
Aug	**Theory:** **Course Code:PHSL1031** Principle of balanced diet.	4
Sep	**Theory:** **Course Code:PHSL1031** Diet survey	4
Oct	**Theory:** **Course Code:PHSL1031** Revision and Question Answer discussion	4
Nov	**Theory:** **Course Code:PHSL1031** Assessment and Revision	2
Dec	**Theory:** **Course Code:PHSL1031** Examination	
	SEM –II (M.D.)	
Jan	**Theory:** **Course Code: PHSL2031** Sound Pollution: Definition, concept of noise, source of sound pollution, effects on human health, preventive measures of sound pollution, noise index and noise standards.	4
Feb	**Theory:** **Course Code: PHSL2031** Soil Pollution: Causes, health hazards, control of soil pollution, solid waste management-Bioremediation and Phyto remediation.	4
Mar	**Theory:** **Course Code: PHSL2031** Radioactive Pollution: Ionizing radiations, effects of ionizing radiation on human health, permissible doses and controlling measure.	2
Apr	**Theory:** **Course Code: PHSL2031** Revision	4
May	**Theory:** **Course Code: PHSL2031** Question Answer discussion and Assessment	4
Jun	**Theory:** **Course Code: PHSL2031** Examination	

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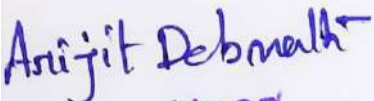# DEPARTMENT OF PHYSIOLOGY

TEACHING PLAN

DR. ARIJIT DEBNATH

Physiology (Major/ Honours) (July 2023 – June 2024)

Month	Sem-I (Major)	No. of Lecture	Sem-III (H)	No. of Lecture	Sem-V (H)	No. of Lecture
Jul	**Theory:** **Course Code: PHSL1011** Introduction Contribution of Indian Scientists in the field of Physiology and allied health sciences: Subodh Chandra Mahalanobis, Sacchidananda Banerjee, Dilip Mahalanabis, Autar Singh Paintal, John Burdon Sanderson Haldane **Practical:** **Course Code: PHSL1011** Examination and staining of fresh squamous epithelium by methylene blue stain.	8 4	**Theory** **CC5:** Red Blood Cells Haemoglobin– Structure, reactions, biosynthesis and catabolism. Foetal haemoglobin. Abnormal haemoglobins- Sickle-cell anemia and Thalassemia. Different types of anaemia and their causes. **Practical** **CC7:** **Introduction** Preparation of Amphibian Ringer solution Kymographic recording of the movements of perfused heart of toad.	8 6	**Theory** **CC11:** Introduction Anatomic considerations Hair cells **CC12:** **Practical:** Introduction Preparation of mammalian Ringer solution .	8 4
Aug	**Theory:** **Course Code: PHSL1011** Contribution of Indian Scientists in the field of Physiology and allied health sciences: Ronald Ross, Upendra Nath Brahmachari, Subhash Mukhopadhyay **Practical:** **Course Code: PHSL1011** Staining of adipose tissue using Sudan III or IV.	8 4	**Theory** **CC5:** Blood Types Blood group – ABO and Rh. Erythroblastosis foetalis. Blood transfusion and its hazards. **Practical** **CC7:** Study of the effects of changes in perfusion fluid pressure, changes in temperature.	8 8	**Theory** **CC11:** Mechanism of hearing Vestibular function Loss of hearing **CC12:** **Practical:** Study of the effects of oxytocin on uterine contraction	8 6
Sept	**Theory:** **Course Code: PHSL1011** Revision **Practical:** **Course Code: PHSL1051:** Preparation and staining of blood film with Leishman's stain. Identification of the blood corpuscles. Differential count of WBC. Total count of RBC and WBC.	4 8	**Theory** **CC5:** Plasma, Hemostasis Plasmaproteins– normal values, origin and functions. Hemostasis– factors, mechanism, anticoagulants, procoagulants. Disorders of hemostasis. Hemophilia, thrombosis and embolism **Practical** **CC7:** Study of the effects of calcium and potassium ion concentration on the movement of heart.	8 8	**Theory** **CC11:** Introduction Smell Receptors & Pathways **CC12:** **Practical** Study of the effects of adrenaline on intestinal movements of rat	8 6
Oct	**Theory:** **Course Code: PHSL1011** Revision and Class test **Practical:** **Course Code: PHSL1051:** Preparation and staining of bone marrow. Measurement of diameter of megakaryocyte.	6 6	**Theory** **CC5:** Lymph Lymph and tissue fluids– formation, circulation, functions and fate. Lymphatic organs- histological structures and functions of lymph gland and spleen. **Practical** **CC7:** Study of the effects of acetylcholine and adrenaline concentration on the movement of heart	8 6	**Theory** .**CC11:** Physiology of Olfaction Taste **Practical:** **CC12:** Study of the effects of adrenaline on uterine movements of rat	8 8 6 6

Month						
Nov	Theory: Course Code: PHSL1011 Revision Practical: Course Code: PHSL1051: Practice	2 4	Theory CC5: Clinical implications of blood and blood related disorders Practical CC7: Practice Study of the effects of acetylcholine and adrenaline concentration on the movement of heart	8 8	Theory CC11: Receptor Organs & Pathways Physiology of Taste Practical: CC12: practice	6 4
Dec	Theory: Revision Practical: Practice Examination	2 2	Theory CC5: Revision Practical: Practice Examination	6 6	Theory CC11: Revision Practical: Practice Examination	6 4
Jan	**Sem-II (Major)** Theory Course Code: PHSL2011 Hemostasis – Definition, factors, modern concept and abnormalities in hemostasis. Anticoagulants used in different purposes. Practical: Course Code: PHSL2011 Preparation and staining of blood film with Leishman's stainand identification of blood cells.	4 6	**Sem-IV (H)** Theory CC10: **Pulmonary Function** Introduction Properties of Gases Anatomy of the Lungs Mechanics of breathing Gas Exchange in the lungs Practical: CC9: Kymographic recording of normal movements of rat's intestine in Dale's apparatus	8 4	**Sem-VI (H)** Theory CC14: Renal Circulation peculiarities and autoregulation Diuretics Disorders of Renal Functions Diabetes insipidus. Practical: DSE4A: Kymographic recording of the effects of As compounds on: the contraction of perfused heart of toad and the intestinal movements of rats in Dale's bath.	8 6
Feb	Theory Course Code: PHSL2011 Blood Grouping- ABO and Rh typing.Cross matching (Major and minor cross matching), blood transfusion and transfusion related hazards. Lymph – Formation, circulation and function. Practical: Course Code: PHSL2011 ESR measurement by Wintrobe's or Western green method. Determination of haematocrit, MCV, MCH, MCHC	6 4	Theory CC10: Pulmonary Circulation Other Functions of the Respiratory System **Gas Transport Between the Lungs & the Tissues** Introduction Oxygen Transport Carbon Dioxide Transport Practical: CC9: Effects of hypoxia on normal intestinal movements	8 6	Theory CC14: Renal function tests–creatinine, inulin, urea and PAH clearance tests. Abnormal constituents of urine, their detection and significance. Renal dialysis. Artificial Kidney. Practical: DSE4A: Kymographic recording of the effects of, Pb compounds on: the contraction of perfused heart of toad, the intestinal movements of rats in Dale's bath.	8 6
Mar	Theory Course Code: PHSL2011 Revision Practical: Course Code: PHSL2011 Bleeding time and clotting time. Course Code: PHSL2051 Estimation of SGPT, SGOT. .	8 6 4	Theory CC10: Respiratory acidosis and alkalosis **Regulation of Respiration** Introduction Neural control of Breathing Chemical Control of Breathing Nonchemical Influences on Respiration Practical: CC9: Effects of acetylcholin on normal intestinal movements	8 4	Theory CC14: Filling of the Bladder Physiology of urinary bladder Emptying of the Bladder Micturition. Non-excretory function of kidney Practical: DSE4A: Kymographic recordind of the effects of Hg compounds on: the contraction of perfused heart of toad, the intestinal movements of rats in Dale's bath.	8

	Theory Course Code: PHSL2011 Question answer discussion and Revision Practical: Course Code: PHSL2051 Estimation of Serum alkaline phosphatase by standard biochemical kit.	8 4	Theory CC10: **Respiratory Adjustments in Health & Disease** Introduction Effects of Exercise Other Forms of Hypoxia Oxygen Treatment Practical: CC9: Effects of adrenaline on normal intestinal movements	8 4	Theory DSE4A: Toxins and Toxicology Factors Affecting toxicity LD50, LOD50, ED50, NOEL, LOEL Concept of Acute and Chronic Effects Practical: DSE4A: Histochemical studies: chronic effects of food additives and arsenic compounds on liver, kidney, intestinal tissues in rat.	8 6
Apr					
May	Theory Course Code: PHSL2011 Revision Practical: Course Code: PHSL2051 Practice	2 4	Theory CC10: Hypercapnia & Hypocapnia Other Respiratory Abnormalities Effects of Increased Barometric Pressure Artificial Respiration . Practical: CC9: **Practice** Effects of acetylcholine and adrenaline on normal intestinal movements	8 6	Theory DSE4A: Birth defects and Teratogens Concepts of Biomagnification and Bioconcentration Popular Food Additives and Food Adulterants Prevention of Food Adulteration Act, 1954 Practical: DSE4A: Histochemical studies: chronic effects of food additives and arsenic compounds on brain, muscle and lung tissues in rat.	8 6
June	Theory Revision Practical Practice **Examination**	2 4	Theory CC10: **Revision** Practical **Practice** **Examination**	6 6	Theory DSE3A: **Revision** Practical **Practice** Examination	6 4

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DEPARTMENT OF PHYSIOLOGY
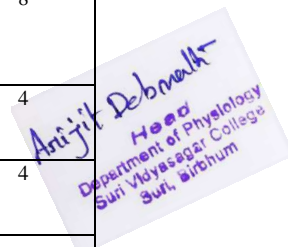
TEACHING PLAN

DR. ARIJIT DEBNATH

Physiology (Minor/ General/generic) (July 2023 – June 2024)

Month	Sem-I (Minor)	No. of Lecture	Sem-III (G/GE)	No. of Lecture	Sem-V (G/GE)	No. of Lecture
Jul	**Theory:** **Course Code: PHSL1021** Introduction Contribution of Indian Scientists in the field of Physiology and allied health sciences: Subodh Chandra Mahalanobis, Sacchidananda Banerjee, Dilip Mahalanabis, Autar Singh Paintal, John Burdon Sanderson Haldane	8 4	**Theory** **CC1C:** Anatomy and histology of the heart. Properties of cardiac muscle. Origin and propagation of cardiac impulse.	4	**Theory:** **DSE1A:** Structure and classification of nerves. Origin and propagation of nerve impulse. Velocity of impulse in different types of nerve fiber.	4
Aug	**Theory:** **Course Code: PHSL1021** Contribution of Indian Scientists in the field of Physiology and allied health sciences: Ronald Ross, Upendra Nath Brahmachari, Subhash Mukhopadhyay	8 4	**Theory:** **CC1C:** Cardiac cycle: events. Heart sounds. Heart rate. Cardiac output: methods of determination (dye dilution and Fick principle), factors affecting, regulation.	4	**Theory:** **DSE1A:** Properties of nerve fibers: all or none law, rheobase and chronaxie, refractory period. indefatiguability	3
Sept	**Theory:** **Course Code: PHSL1021** Revision	4 4	**Theory** **CC1C:** Structure of arteries, arterioles, capillaries. venules and veins. Pulse - arterial and venous.	3	.**Theory:** **DSE1A:** Synapses: structure, different types, mechanism of synaptic transmission.	4
Oct	**Theory:** **Course Code: PHSL1021** Revision and Class test	2 2	**Theory** **CC1C:** Blood pressure and its regulation and factors controlling. Baro- and chemoreceptors. Vasomotor reflexes. Methods of measurement of blood pressure.	4	**Theory:** ___ **DSE1A:** Motor unit. Myoneural junction: structure,	3
Nov	**Theory:** **Course Code: PHSL1021** Revision and Assessment	2 2	**Theory** **CC1C:** Peculiarities of regional circulations coronary, pulmonary, renal, hepatic and cerebral.	4	**Theory:** **DSE1A:** Mechanism of impulse transmission. Degeneration and regeneration in nerve fibres	3
Dec	**Theory:** **Revision** **Practical:** **Practice** **Examination**	2 2	**Theory** **CC1A:** Revision Examination	3	**Theory:** **DSE1A** Revision Examination	3
	Sem-II (Minor)		**Sem-IV (G/GE)**		**Sem-VI (G/GE)**	
Jan	**Theory** **Course Code: PHSL2011** Hemostasis – Definition, factors, modern concept and abnormalities in hemostasis. Anticoagulants used in different purposes.	3	**Theory:** **CC1D:** Elementary structure of kidney and location Relationship between structure and function of kidney	3	**Theory:** **SEC4B:** Some common pollutants and their effects- carbon monoxide, lead, arsenic.	4
Feb	**Theory** **Course Code: PHSL2011** Blood Grouping- ABO and Rh typing.Cross matching (Major and minor cross matching), blood transfusion and transfusion related hazards. Lymph – Formation, circulation and function.	3	**Theory:** **CC1D:** Mechanism of formation of urine Normal and abnormal constitution of urine	4	**Theory:** **SEC4B:** Some common pollutants and their effects- carbon monoxide, lead, arsenic.	4

Month		No.		No.		No.
	Practical: **Course Code: PHSL2011** ESR measurement by Wintrobe's or Western green method. Determination of haematocrit, MCV, MCH, MCHC					
Mar	**Theory** **Course Code: PHSL2011** Revision **Practical:** **Course Code: PHSL2011** Bleeding time and clotting time.	3	**Theory:** **CC1D:** Physiology of urine storage and micturition	4	**Theory:** **SEC4B:** Some common pollutants and their effects- carbon monoxide, lead, arsenic.	4
Apr	**Theory** **Course Code: PHSL2011** Question answer discussion and Revision	4 2	**Theory** Renal regulation of acid- base balance	3	**Theory:** **SEC4B:** Effect of noise on human body and preventive measure	4
May	**Theory** **Course Code: PHSL2011** Revision	3 4	**Theory:** **CC1D:** Non excretory function of kidney	3	**Theory:** **SEC4B:** Effect of noise on human body and preventive measure	4
June	**Examination**	2 2	**Theory:** **CC1D:** Revision Examination	4	**Theory:** **SEC4B:** Revision Examination	4

Physiology (Multi Disciplinary) (July2023– June   2024)

Month	SEM –I (M.D : Nutrition and Dietetics)	No. of lecture
Jul	**Theory:** **Course Code:PHSL1031** Classification of nutrients, Carbohydrate, protein, fat, vitamin, mineral and water.	5
Aug	**Theory:** **Course Code:PHSL1031** Macro and micro- elements, deficiency symptoms of vitamins.	5
Sep	**Theory:** **Course Code:PHSL1031** Composition and nutritional value of common Indian foodstuffs – rice, wheat, pulses, egg, meat, fish and milk.	5
Oct	**Theory:** **Course Code:PHSL1031** Revision and Question Answer discussion	4
Nov	**Theory:** **Course Code:PHSL1031** Revision and Assessment	2
Dec	**Theory:** **Course Code:PHSL1031** Examination	
	SEM –II (MD: Environmental Physiology and Human Health)	
Jan	**Theory:** **Course Code: PHSL2031** Water Pollution: D efinition, types, water pollutants-sources, health hazards, preventive measures. Biological Oxygen Demand (BOD),concept of safe drinking water standards.	4
Feb	**Theory:** **Course Code: PHSL2031** Pesticides, fungicides and herbicides and human health.	4
Mar	**Theory:** **Course Code: PHSL2031** Heavy metals (arsenic, fluoride, mercury and lead) and halide (fluoride) pollution and effect on human health.	8
Apr	**Theory:** **Course Code: PHSL2031** Revision	4
May	**Theory:** **Course Code: PHSL2031** Question Answer Discussion and Assessment	4
Jun	**Theory:** **Course Code: PHSL2031** Examination	

DEPARTMENT OF PHYSIOLOGY

TEACHING PLAN

NUPUR PAUL

Physiology (Major/ Honours) (July 2023– June 2024)

Month	Sem-I (Major)	No. of Lecture	Sem-III (H)	No. of Lecture	Sem-V (H)	No. of Lecture
Jul	**Theory:** **Course Code: PHSL1011** Tissue, Organ and Systems – General classification, special emphasis on connective tissue and epithelial tissue.	4	**Theory** **CC5:** Introduction Blood Formed elements of blood– origin, formation, functions and fate	4	**Theory** **DSE2A:** Genesis and concept of ergonomics Importance of ergonomics in occupational health and well-being.	4
Aug	**Theory:** **Course Code: PHSL1011** Brief idea on organs and systems. .	2	**Theory** **CC5:** Blood volume –normal values, regulation and determination by dye and radioisotope methods. Bone Marrow	4	**Theory** **DSE2A:** Classification of Physiological work load. Concept of work rest cycle. Physical work environment Thermal environment, its' effect, Heat stress indices Noise and vibration, its' effect on workers. Occupational deafness	4
Sept	**Theory:** **Course Code: PHSL1011** Revision	2	**Theory** **CC5:** White Blood Cells	4	**Theory** **DSE2A:** Illumination level and its' effect on visual performances, Ergonomic principles of control of Physical hazards.	3
Oct	**Theory:** **Course Code: PHSL1011** Revision and Question Answer discussion	2	**Theory** **CC5:** Immune Mechanisms	4	**Theory** .**DSE2A:** Static anthropometry, Application of anthropometric data in design. User interface and control display compatibility.	3
Nov	**Theory:** **Course Code: PHSL1011** Revision and Assessment	3	**Theory** **CC5:** Platelets	4	**Theory** **DSE2A:** Prevention of accidents, concept of Industrial safety. Occupational Diseases: pneumoconiosis, asbestosis, silicosis and work-related musculoskeletal disorders	4
Dec	**Examination**	3	**Theory** **CC5:** **Revision** **Examination**	4	**Theory** **DSE2A:** **Revision** **Examination**	3
Jan	**Sem-II (Major)**		**Sem-IV (H)**		**Sem-VI (H)**	
Jan	**Theory:** **Course Code: PHSL2011** Introduction. Blood – Components and general function. **Practical:** **Course Code: PHSL2011** Preparation and staining of blood film with Leishman's stainand identification of blood cells. Differential count of WBC.	5 6	**Theory** **CC9:** . **Digestion & Absorption** Introduction Anatomy and histology of alimentary canal, Deglutition	3	**Theory** **CC14:** Renal Functions and Malnutrition: Introduction Anatomy of kidney. Histology of Nephron. Function of Malpighian corpuscles and renal tubule,	4
Feb	**Theory** **Course Code: PHSL2011** Plasma - Composition and function. **Practical:** **Course Code: PHSL2011** Preparation of haemin crystal. Blood group determination and Rh typing.	2 4	**Theory** **CC9:** Movements of alimentary canal and their regulations	3	**Theory** **CC14:** counter-current mechanism Formation of urine –glomerular function and tubular functions. Counter -current multiplier and exchanger.	4

Mar	**Theory** **Course Code: PHSL2011** Revision **Practical:** **Course Code: PHSL2011** Practice	**2**	**Theory** **CC9:** Absorption of Water & Electrolytes	**3**	**Theory** **CC14:** Formation of hypertonic urine. Water Excretion Renal regulation of osmolarity and volume of blood fluids	**3**
Apr	**Theory** **Course Code: PHSL2011** Revision **Practical:** **Course Code: PHSL2011** Practice	**2** **2**	**Theory** **CC9:** Absorption of Vitamins & Minerals	**3**	**Theory** **DSE4A:** Acidification of the Urine & Bicarbonate Excretion Renal regulation of acid-base balance, acidification of urine	**3**
May	**Theory** **Course Code: PHSL2011** Revision **Practical:** **Course Code: PHSL2011** Practice	**2** **2**	**Theory** **CC9:** Absorption of Vitamins & Minerals	**3**	**Theory** **DSE4A:** Regulation of Na+ & Cl- Excretion	**2**
June	**Examination**		**Theory** **CC9:** **Revision** **Examination**	**3**	**Theory** **CC14:** **Revision** **Examination**	**3**

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DEPARTMENT OF PHYSIOLOGY
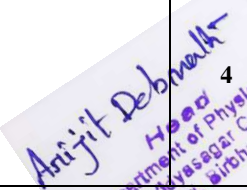
TEACHING PLAN

NUPUR PAUL

Physiology (Minor/General/generic) (July 2023 – June 2024)

Month	Sem-I (Minor)	No. of Lecture	Sem-III (G/GE)	No. of Lecture	Sem-V (G/GE)	No. of Lecture
Jul	**Theory:** **Course Code: PHSL1021** Tissue, Organ and Systems – General classification, special emphasis on connective tissue and epithelial tissue. **Practical:** **Course Code: PHSL1021** Introduction on: Principle, working procedure and function of different components of microscope. Identification of Tissue sections of: kidney, salivary glands, pancreas, adrenal gland, thyroid gland, testes, ovary, uterus, spinal cord, cerebral cortex, cerebellum, skin, cardiac muscle, skeletal muscle, smooth muscle, artery and vein.	4 4 8	**Theory** **CC1C:** Anatomy and histology of the respiratory passage and organs. **Practical:** **CC1C:** Leishman's staining of human blood film and identification of different typrs of blood corpuscles.	3 4	**Theory:** **DSE1A:** Different types of muscle and their structure. Red and white muscle. **Practical:** **DSE1A:** Use of kymograph .	8 4
Aug	**Theory:** **Course Code: PHSL1021** Brief idea on organs and systems. **Practical:** **Course Code: PHSL1021** Examination and staining of fresh squamous epithelium by methylene blue stain.	3 4	**Theory:** **CC1C:** Role of respiratory muscles in breathing. Artificial respiration. Practical: **CC1C:** Preparation of Haemin crystals.	4 4	**Theory:** **DSE1A:** Muscular contraction: structural, mechanical and chemical changes in skeletal muscle during contraction and relaxation. **Practical:** **DSE1A:** Recording of pneumography	8 4
Sept	**Theory:** **Course Code: PHSL1021** Revision and Question Answer discussion **Practical:** **Course Code: PHSL1021** **Practical:** **Course Code: PHSL1021** Staining of adipose tissue using Sudan III or IV.	3 6 4	**Theory** **CC1C:** Significance of physiological and anatomical dead space. Lung volumes and capacities. Practical: **CC1C:** Leishman's staining of human blood film and identification of different typrs of blood corpuscles.	3 4	**Theory:** **DSE1A:** Isotonic and isometric contractions. **Practical:** **DSE1A:** **Practice** Use of kymograph	4 4
Oct	**Theory:** **Course Code: PHSL1021** Revision **Practical:** **Course Code: PHSL1021** Practice	3 4	**Theory** **CC1C:** Exchange of respiratory gases between lung and blood and between blood and tissues. Transport of oxygen and carbon dioxide in blood. Practical: **CC1C:** Preparation of Haemin crystals.	4 4	**Theory:** **DSE1A:** Properties of muscle: all or none law, beneficial effect, summation. refractory period, tetanus, fatigue. **Practical:** **DSE1A:** **Practice**	6 2
Nov	**Theory:** **Course Code: PHSL1021** Revision **Practical:** **Course Code: PHSL1021** Practice	4 4	**Theory** **CC1C:** Regulation of respiration - neural and chemical. Hypoxia. Practical: **CC1C:** Leishman's staining of human blood film and identification of different typrs of blood corpuscles.	4 4	**Theory:** **DSE1A:** A brief idea about the muscle spindle. **Practical:** **DSE1A:** **Practice**	3 2

Month	Sem-II (Minor)		Sem-IV (G/GE)		Sem-VI (G/GE)	
Dec	**Examination**	3 2	**Theory** CC1A: Revision Examination	3	**Theory:** DSE1A Revision Examination	3
	Sem-II (Minor)		Sem-IV (G/GE)		Sem-VI (G/GE)	
Jan	**Theory:** **Theory:** **Course Code: PHSL2021** Introduction. Blood – Components and general function. **Practical:** **Course Code: PHSL2021** Preparation and staining of blood film with Leishman's staina and identification of blood cells. Differential count of WBC.	3 4 6	**Theory:** CC1D: **Skin and regulation of body temperature** Structure and functions of skin **Practical:** CC1D: Identification of normal constitution of urine-Chloride	3 4 4	**Theory:** SEC4B: Environment - its physiological aspects.	4
Feb	**Theory:** **Course Code: PHSL2021** Plasma - Composition and function. **Practical:** **Course Code: PHSL2021** Total count of RBC and WBC. Bleeding time and clotting time ESR measurement by Wintrobe's or Western green method. Determination of haematocrit, MCV, MCH, MCHC	3 4 6	**Theory:** CC1D: Insensible and sensible perspiration **Practical:** CC1D: Identification of normal constitution of urine-Sulphate	4 4	**Theory:** SEC4B: Effect of extreme temperature on humans.	4
Mar	**Theory:** **Course Code: PHSL2021** Revision **Practical:** **Course Code: PHSL2011** Hemoglobin estimation by Sahli's method.	3 4	**Theory:** CC1D: Regulation of body temperature-physical and physiological process involved in it. **Practical:** CC1D: Identification of normal constitution of urine-Phosphate	4 4	**Theory:** SEC4B: Hypobaric environment- effects on physiological system, acclimatization	4
Apr	**Theory:** **Course Code: PHSL2021** Revision **Practical:** **Course Code: PHSL2021** Preparation of haemin crystal. Blood group determination and Rh typing.	3 4	**Theory** CC1D: **Revision** Structure and functions of skin **Practical:** CC1D: Identification of normal constitution of urine-Creatinine	3 4	**Theory:** SEC4B: Hyperbaric conditions and Caisson disease.	4
May	**Theory:** **Course Code: PHSL2021** Revision **Practical:** **Course Code: PHSL2021** Revision	2 2	**Theory:** CC1D: Revision Insensible and sensible perspiration **Practical:** CC1D: Identification of normal constitution of urine-Urea	3 4	**Theory:** SEC4B: Brief idea of cyanosis, dyspnea, hyperpnoea, apnea, asphyxia.	4
June	**Theory:** Revision **Practical:** Practice Examination	2 2	**Theory:** CC1D: Revision **Practical:** CC1D: Practice Examination	2 2	**Theory:** SEC4B: Revision Examination	4 4

DEPARTMENT OF PHYSIOLOGY

TEACHING PLAN

DR. DEBLINA BALL

Physiology (Honours)

(July 2023 – June 2024)

Month	Sem-I (Major)	No. of Lecture	Sem-III (H)	No. of Lecture	Sem-V (H)	No. of Lecture
Jul	**Theory:** **Course Code: PHSL1011** Transport Across Cell Membranes - Active, passive, carrier mediated, antiport and symport. **Practical:** **Course Code: PHSL1011** Study and identification of stained section of different mammalian tissues and organs**:** spinal cord, cerebral cortex, cerebellum **Course Code: PHSL1051** Preparation and staining of blood film with Leishman's stain. Identification of the blood corpuscles.	4 4 4	**Theory** **CC6:** **Cutaneous, Deep and Visceral Sensation** Introduction Ascending and descending tracts: origin, courses, termination and functions. Lower and upper motor neurones. Functions of the spinal cord with special reference to functional changes following hemisection and complete section of spinal cord. Brown-Sequard syndrome, Spinal animal. **Practical** **CC5:** Preparation and staining of blood film with Leishman's stain. Identification of the blood corpuscles.	8 6	**Theory** **CC12:** **The Thyroid Gland** Introduction Anatomic Considerations Formation & Secretion of Thyroid Hormones Transport of Thyroid Hormones Effects of Thyroid Hormones Regulation of Thyroid Secretion Clinical Correlates **Practical:** **CC11:** Principles of fixation and staining, Staining and identification of fixed endocrine glands and nervous tissue. .	8 6
Aug	**Theory:** **Course Code: PHSL1011** Intercellular Communication – Gap junction, tight junction, intercalated disc, desmosomes and cell adhesion molecules. Extracellular matrix components. **Practical:** **Course Code: PHSL1011** Study and identification of stained section of different mammalian tissues and organs: Parotid gland, Sub maxillary gland, Sublingual gland, Tongue, Oesophagus, Stomach, Duodenum, Jejunum, Ileum, Large intestine, Liver **Course Code: PHSL1051** Bleeding time and clotting time.	4 6	**Theory** **CC7:** Pain production, perception and regulation. Referred pain. Pathways Touch Proprioception Temperature Pain Other Sensations **Control of Posture and Movement :** Introduction General Principles Corticospinal & Corticobulbar System Anatomy & Function Posture and its regulation Decerebrate rigidity, Decorticate rigidity, Postural reflexes and regulation of Posture **Practical** **CC5:** Differential count of WBC. Total count of RBC and WBC. Bleeding time and clotting time Hemoglobin estimation	8 8	**Theory** **CC12:** **Endocrine Functions of the Pancreas & the Regulation of Carbohydrate Metabolism:** Introduction Islet Cell Structure Structure, Biosynthesis, & Secretion of Insulin Effects of Insulin Mechanism of action Insulin Excess Regulation of Insulin Secretion Glucagon Other Islet Cell Hormones Hypoglycemia & Diabetes Mellitus in Humans **Practical:** **CC11:** Practice Staining and Identification of Histological sections provided	8 6 6
Sept	**Theory:** **Course Code: PHSL1011** Revision and Question Answer discussion **Practical:** **Course Code: PHSL1011** Study and identification of stained section of different mammalian tissues and organs: skin, cardiac muscle, skeletal muscle, smooth muscle, artery and vein. **Course Code: PHSL1051** Hemoglobin estimation. Preparation of haemin crystals.	4 4 4	**Theory:** **CC7:** Basal Ganglia Cerebellum Movement disorders **Neural Basis of Instinctual Behaviour and Emotions :** a. Introduction b. Anatomic Considerations c. Limbic Functions Limbic system: structure, connections and functions. Physiology of emotion. **Practical** **CC5:** Preparation of haemin crystals Preparation and staining of bone marrow. Measurement of diameter of megakaryocyte.	8 4 4 6	**Theory** **CC12:** **The Pituitary Gland:** Introduction Morphology Posterior pituitary hormones Growth Hormone Physiology of Growth Pituitary Insufficiency Pituitary Hyperfunction in Humans **Practical:** **CC11:** Practice Staining and Identification of Histological sections provided	8 4

Month	Sem-II (Major)		Sem-IV (H)		Sem-VI (H)	
Oct	**Theory:** **Course Code: PHSL1011** Revision and Class test **Practical:** **Course Code: PHSL1011** Practice **Course Code: PHSL1051** Practice	6 4	**Theory** **CC7:** d. Sexual Behavior e. Fear & Rage f. Motivation **Higher Functions of the Nervous System** **a.** Introduction **b.** Methods **c.** Learning & Memory Higher functions of nervous system: conditioning, learning, short-term and long- term memory. **Practical** **CC5:** **10.** Reticulocyte staining **11. .** Blood group determination.	8 4	**Theory** **CC12:** Revision **Practical:** **CC11:** Class Test Staining and Identification of Histological sections provided	4 4
Nov	**Theory:** **Course Code: PHSL1011** Question Answer discussion and Assessment **Practical:** **Course Code: PHSL1011** Class Test Slide Identification **Course Code: PHSL1051** Practice	5 2	**Theory** **CC7:** Speech and Aphasia. Asymmetrical organization of certain cognitive functions-split brain **d.** Functions of the Neocortex Electrophysiology of brain: spontaneous electrical activity of brain, EEG and ECoG, evoked potential, DC potential. Isolated cortex. **e.** Disorders relating learning and memory **Practical** **CC5:** Practice Preparation and staining of blood film with Leishman's stain. Identification of the blood corpuscles.	8 4	**Theory** **CC12:** Question Answer discussion and Assessment **Practical:** Class test on Practical	4 2
Dec	**Theory:** **Course Code: PHSL1011** Revision **Practical** Practice (if required) **Examination**	4 4	**Theory** **CC7:** Revision and Question Answer discussion **Practical** Practice (if required) **Examination**	4 4	**Theory** **CC12:** Revision **Practical** Practice (if required) **Examination**	4 4
Month	**Sem-II (Major)**		**Sem-IV (H)**		**Sem-VI (H)**	
Jan	**Theory** **Course Code: PHSL2011** Red Blood Cells – Erythropoiesis; hemoglobin-types, synthesis and fate. Brief idea on Anaemia, polycythemia and hemoglobinopathies and Thalassemia. Brief idea on MCV, MCH. MCHC and colour index. **Practical:** **Course Code: PHSL2011** Preparation and staining of blood film with Leishman's stainand identification of blood cells. Differential count of WBC	8 4	**Theory** **CC9:** **Regulation of Gastrointestinal Function** Introduction Digestive glands – histological structures of salivary glands, pancreas and liver. **Practical:** **CC10:** Measurement of peak expiratory flow rate Measurement of oxygen saturation by pulse oxymeter before and after exercise	6 4	**Theory** **CC13:** Introduction Primary and accessory sex organs and secondary sex characters, Physiology of puberty. Sex Differentiation & Development a. Chromosomal Sex Embryology of the Human Reproductive System Aberrant Sexual Differentiation Puberty Precocious & Delayed Puberty Menopause Pituitary Gonadotropins & Prolactin **Practical:** **CC13:** Study of estrous cycle	8 6

	Theory		Theory		Theory	
Feb	**Theory** **Course Code: PHSL2011** Platelets - Formation and fate Separation of different components of blood in blood bank and their clinical importance. **Practical:** **Course Code: PHSL2011** Total count of RBC and WBC. Bleeding time and clotting time. **Course Code: PHSL2051** Discussion on Principle and application of colorimeter and spectrophotometer.	6 4 4	**Theory** **CC9:** General Considerations Composition, functions and regulation of the secretion of salivary, gastric, pancreatic and intestinal juices and bile. Synthesis of Bile acids. Enterohepatic circulation, Feces and defecation. GALT, MALT. Basic concepts of Peptic Ulcer, Jaundice and Gall-stones Cholelithiasis. **Practical:** **CC10:** Measurement of forced expiratory volume (FEV) in first second	8 2	**Theory** **CC13:** **The male reproductive System** Structure Histology of testis Gametogenesis & Ejaculation Endocrine Function of the Testes Control of Testicular Function Abnormalities of Testicular Function **Practical:** **CC13:** Staining and identification of kidney and ureter	10 4
Mar	**Theory** **Course Code: PHSL2011** Revision and Question Answer discussion **Practical:** **Course Code: PHSL2011** Hemoglobin estimation by Sahli's method. Preparation of haemin crystal **Course Code: PHSL2051** Discussion on Pathophysiological significance of blood parameters – Glucose, serum protein, albumin, urea, creatinine	6	**Theory** **CC9:** Gastrointestinal hormones Mouth & Esophagus Stomach Exocrine Portion of the Pancreas Liver & Biliary System **Practical:** **CC10:** Practice	8 4	**Theory** **CC13:** 6. Pregnancy Fertilization, Preliminary ideas of implantation. Structure and functions of placenta. Maintenance of pregnancy and the bodily changes during pregnancy. Pregnancy tests. Parturition. **Practical:** **CC13:** Pregnancy test from human urine by kit method	8 2
Apr	**Theory** **Course Code: PHSL2011** Revision **Practical:** **Course Code: PHSL2051** Discussion on Pathophysiological significance of blood parameters – Uric acid, bilirubin and ketone bodies	2 4	**Theory** **CC9:** Small Intestine Colon **Practical:** **CC10:** Practice (if required)	4 4	**Theory** **CC13:** Lactation Mammogenesis, Galactopoesis: Hormonalcontrol **Practical:** **CC13:** Practice	4 4
May	**Theory** **Course Code: PHSL2011** Revision **Practical:** **Course Code: PHSL2051** Estimation of Blood glucose by GOD-POD method	2 4	**Theory** **CC9:** Revision, Question Answer discussion and Assessment **Practical:** Class Test .	5 2	**Theory** **CC13:** Revision, Question Answer discussion and Assessment **Practical:** **CC13:** Class Test	5 2
June	**Theory** **Revision** **Practical** Practice **Examination**		**Theory** **CC9:** **Revision** **Practical** Practice (if required) **Examination**	2 2	**Theory** **CC13:** **Revision** **Practical** Practice (if required) **Examination**	2 2

DR. DEBLINA BALL

Physiology (Minor/ Generic/ General)

(July 2023 – June 2024)

Month	Sem-I (Minor)	No. of Lecture
July	**Theory:** **Course Code: PHSL1021** Transport Across Cell Membranes - Active, passive, carrier mediated, antiport and symport. **Practical:** **Course Code: PHSL1021** Study and identification of stained section of different mammalian tissues and organs**:** spinal cord, cerebral cortex, cerebellum	**4**
Aug	**Theory:** **Course Code: PHSL1021** Intercellular Communication – Gap junction, tight junction, intercalated disc, desmosomes and cell adhesion molecules. Extracellular matrix components.	**6**
	Practical: **Course Code: PHSL1021** Study and identification of stained section of different mammalian tissues and organs: Parotid gland, Sub maxillary gland, Sublingual gland, Tongue, Oesophagus, Stomach, Duodenum, Jejunum, Ileum, Large intestine, Liver	**6**
Sep	**Theory:** **Course Code: PHSL1021** Revision and Question Answer discussion	**2**
Oct	**Theory:** **Course Code: PHSL1021** Revision	**2**
Nov	**Theory:** **Course Code: PHSL1021** Revision and Question Answer discussion	**6**
Dec	**Examination**	

Month	Sem-II (Minor)	No of Lecture	Sem-VI (GE/Gen)	No of Lecture
Jan	**Theory** **Course Code: PHSL2021** Red Blood Cells – Erythropoiesis; hemoglobin-types, synthesis and fate. Brief idea on Anaemia, polycythemia and hemoglobinopathies and Thalassemia. Brief idea on MCV, MCH. MCHC and colour index. **Practical:** **Course Code: PHSL2021** Preparation and staining of blood film with Leishman's stainand identification of blood cells.	**6**	**Theory** **DSE1B** Sensory Physiology: Classification of general and special senses and their receptors. Receptors as biological transducer. Olfaction and Gustation: Structure of sensory organ, neural pathway of olfactory and gustatory sensation. Physiology of olfactory and gustatory sensation. Olfactory and gustatory adaptation. After-taste.	**8**

	Differential count of WBC				
Feb	**Theory** **Course Code: PHSL2021** Platelets - Formation and fate Separation of different components of blood in blood bank and their clinical importance.	6	**Theory** **DSE1B** Physiology of olfactory and gustatory sensation. Olfactory and gustatory adaptation. After-taste. Audition: Structure of ear, auditory pathway, mechanism of hearing.	8
	Practical: **Course Code: PHSL2021** Total count of RBC and WBC. Bleeding time and clotting time	4		
Mar	**Theory** **Course Code: PHSL2021** Revision and Question Answer discussion	4	**Theory** **DSE1B** Vision: Structure of the eye. Histology of retina. Visual pathway. Light reflex. Chemical changes in retina on exposure to light. Accommodation - mechanism and pathway. Errors of refraction. Positive and negative after-image. Light and dark adaptation. Elementary idea of colour vision and colour blindness	8
	Practical: **Course Code: PHSL2021** Hemoglobin estimation by Sahli's method. Preparation of haemin crystal	4		
Apr	**Theory** **Course Code: PHSL2021** Revision	2	**Theory** **DSE1B** Revision and Question Answer discussion	6
	Practical: **Course Code: PHSL2021** Practice	2		
May	**Theory** **Course Code: PHSL2021** Revision and Assessment	2	**Theory** **DSE1B** Assessment	2
	Practical: **Course Code: PHSL2021** Practice	2		
Jun	**Examination**		**Examination**	2

Physiology (Multi Disciplinary) (July2023– June 2024)

Month	SEM –I (M.D : Nutrition and Dietetics)	No. of lecture
Jul	**Theory:** **Course Code:PHSL1031** Malnutrition and its causes - PCM, marasmus, kwashiorkor their prevention. Iron and iodine deficiency.	5
Aug	**Theory:** **Course Code:PHSL1031** Role of nutrients and food on health management and disease prevention - Hypertension, diabetes, cardiovascular disease, obesity, immunodeficiency disease, anaemia, undernutrition.	8
Sep	**Theory:** **Course Code:PHSL1031** Concept of health, food hygiene, food style, life style for disease prevention	5
Oct	**Theory:** **Course Code:PHSL1031** Revision and Question Answer discussion	4
Nov	**Theory:**	2

	Course Code:PHSL1031 Revision and Assessment		
Dec	**Theory:** **Course Code:PHSL1031** Examination		
	SEM –II (M.D: Environmental Physiology and Human Health)		
Jan	**Theory:** **Course Code: PHSL2031** Basic concept of environment and its components. Interrelationship of different components of an environment.	2	
Feb	**Theory:** **Course Code: PHSL2031** Pollutants: Definition and types	2	
Mar	**Theory:** **Course Code: PHSL2031** Air pollution: Definition, source, effects of air pollutant (SO_X, NO_X, CO_X and particulate matter) on human health and their control in brief	5	
Apr	**Theory:** **Course Code: PHSL2031** Revision and Question Answer discussion	4	
May	**Theory:** **Course Code: PHSL2031** Class test and Assessment	2	
Jun	**Theory:** **Course Code: PHSL2031** Examination		

Arijit Debnath

DEPARTMENT OF PHYSIOLOGY

TEACHING PLAN

HAIMANTI CHATTERJEE

Physiology (Major/Honours) (July 2023 – June 2024)

Month	Sem-I (Major)	No. of Lecture	Sem-III (H)	No. of Lecture	Sem-V (H)	No. of Lecture
Jul	**Theory:** **Course Code: PHSL1011** Cell Cycle – Definition, different phases of cell cycles, regulation and check points of cell cycle. **Practical:** **Course Code: PHSL1011** Study and identification of stained sections of different mammalian tissues and organs: spinal cord, cerebral cortex, cerebellum **Course Code: PHSL1051** Blood group determination.	4 4 4	**Theory** **CC7:** **Reflexes: a.** Introduction **b.** Monosynaptic Reflexes: The Stretch Reflex **c.** Polysynaptic Reflexes: The Withdrawal Reflex **d.** General Properties of Reflexes **Arousal Mechanism, Sleep and the Electrical Activity of the Brain** **a.** Introduction **b.** The Reticular Formation & the Reticular Activating System Reticular formation: organization, connection and functions of ascending and descending reticular formation. Physiological basis of sleep and wakefulness	4 4	**Theory** **CC12:** **The Adrenal Medulla & Adrenal Cortex** a. Introduction b. Adrenal Morphology c. Adrenal Medulla I. Structure & Function of Medullary Hormones II. Regulation of Adrenal Medullary Secretion d. Adrenal Cortex I. Structure & Biosynthesis of Adrenocortical Hormones II. Effects of Adrenal Androgens & Estrogens III. Physiologic Effects of Glucocorticoids IV. Pharmacologic & Pathologic Effects of Glucocorticoids V. Regulation of Glucocorticoid Secretion VI. Effects of Mineralocorticoids **DSE1A: BIOLOGICAL STATISTICS** Scope of statistics – Principles of statistical analysis of biological data. Basic concepts – variable, parameter, statistics. Sampling. Presentation of data-frequency distribution, frequency polygon, histogram, bar diagram and pie diagram.	4 3 5 4
Aug	**Theory:** **Course Code: PHSL1011** Cell division a) Mitosis – Phases and significance. b) Meiosis – Phases and significance. c) Special emphasis on homologous, heterologous, chiasma formation, crossing over, recombination and disjunction of chromosome. **Practical:** **Course Code: PHSL1051:** Bleeding time and clotting time. Preparation and staining of bone marrow. Measurement of diameter of megakaryocyte**.**	5 8	**Theory** **CC7:** The Thalamus & the Cerebral Cortex Evoked Cortical Potentials The Electroencephalogram Physiological Basis of the EEG, Consciousness, & Sleep Interpretation of abnormal EEG pattern	4 6	**Theory** **CC12:** **The Adrenal Medulla & Adrenal Cortex** VII. Regulation of Aldosterone Secretion VIII. Summary of the effects of Adrenocortical Hyper & Hypofunction in Humans **Hormonal Control of Calcium Metabolism & the Physiology of Bone** a. Introduction b. Calcium & Phosphate Metabolism c. Bone Physiology d. Vitamin D & the Hydroxycholecalciferols e. The Parathyroid Glands f. Calcitonin **DSE1A: BIOLOGICAL STATISTICS** Parameters Different classes of statistics- mean, median, mode, mean deviation, variance, standard deviation, standard error of mean.	3 6 2 4

Sept	Theory: **Course Code: PHSL1011** Revision **Course Code: PHSL1051:** Hemoglobin estimation	4 2	Theory **CC7:** Introduction Anatomic Organization of Autonomic Outflow Chemical Transmission at autonomic Junctions Responses of Effector Organs to Autonomic Nerve Impulses Cholinergic and Adrenergic Discharge	4	Theory **CC12:** g. Effects of Other Hormones & Humoral Agents on Calcium Metabolism **Endocrine Functions of the Kidneys, Heart, & Pineal Gland** a. Introduction b. The Renin-Angiotensin System c. Erythropoietin d. The Endocrine Function of the Heart: Atrial Natriuretic Peptide e. Pineal Gland f. Human chronobiology, biological rhythms; basic concepts and implications **DSE1A: BIOLOGICAL STATISTICS** Standard score. Degrees of freedom	2 5 2 2 3 2
Oct	Theory: Theory: **Course Code: PHSL1011** Revision **Course Code: PHSL1051:** Practice	2 4	Theory **CC7:** **Central Regulation of Visceral Function a.** Introduction **b.** Medulla Oblongata **c.** Hypothalamus **i.** Anatomic Considerations **ii.** Hypothalamic Function **iii.** Relation to Autonomic Function **iv.** Relation to Sleep **v.** Relation to Cyclic Phenomena **vi.** Hunger **vii.** Thirst **viii.** Control of Posterior Pituitary Secretion **ix.** Control of Anterior pituitary Secretion **x.** Temperature Regulation, fever	5	Theory **DSE1A:** Probability. Normal distribution. Student's t-distribution Practice Testing of hypothesis - Null hypothesis, errors of inference Practice	8 2 4 2
Nov	Theory: **Course Code: PHSL1011** Question Answer discussion and Class test **Practical:** **Course Code: PHSL1051:** Practice	4	Theory **CC7:** **Neural Basis of Instinctual Behaviour and Emotions** a. Introduction b. Anatomic Considerations c. Limbic Functions Limbic system: structure, connections and functions. Physiology of emotion. d. Sexual Behavior e. Fear & Rage f. Motivation Revision Class test	3 4	Theory **DSE1A:** levels of significance, students' t-test and z score for significance of difference. Practice Distribution-free test - Chi-square test Practice	6 4 4 2
Dec	Theory: **Course Code: PHSL1011** Revision **Course Code: PHSL1051:** Practice **Examination**	4	Theory **CC7:** **Revision** **Class test** **Examination**	6 4	Theory **DSE1A:** **Revision** **Practice** **Class test** **Examination**	6 4 4
	Sem-II (Major)		**Sem-IV (H)**		**Sem-VI (H)**	

Month		Hours		Hours		Hours
Jan	**Theory** **Course Code: PHSL2011** Bone Marrow – Red and yellow. Blood Cells-their morphology and functions. **Practical** **Course Code: PHSL2011** Bleeding time and clotting time. Hemoglobin estimation by Sahli's method	4 6	**Theory** **CC8:** Introduction Energy metabolism **Carbohydrate metabolism** Glycolysis, R-L cycle Detail, TCA cycle. Gluconeogenesis Cori cycle, Glucose Alanine cycle. Anaplerotic reactions and Amphibolic nature of TCA cycle. Pentose Phosphate Pathway.	2 14 2	**Theory** **CC13** The Female Reproductive system Histology of ovary, Oogenesis, folliculogenesis and ovulation. The Menstrual Cycle Formation, functions of corpus luteum and leuteolysis,	6 2
Feb	**Theory** **Course Code: PHSL2011** White Blood Cells – Morphology, classification, life cycles, functions, Human leucocyteantigen (HLA).Leucopoiesis, Arneth index. **Practical:** **Course Code: PHSL2051** Discussion on Principle and application of colorimeter and spectrophotometer	4 2	**Theory** **CC8:** Glycogenesis and Glycogenolysis. Protein metabolism Amino acids, Amino acid pool. Deamination, transamination, amination and decarboxylation. Synthesis of Urea and Nitric oxide. Basic idea of glucogenic and ketogenic amino acids.	4 4 4 2	**Theory** **CC13:** Menstrual cycle and its regulation b. Ovarian Hormones c. Control of Ovarian Function d. Abnormalities of Ovarian Function	10
Mar	**Theory** **Course Code: PHSL2011** Revision and Question Answer discussion **Practical:** **Course Code: PHSL2051** Estimation of Serum cholesterol.	4 4	**Theory** **CC8:** Metabolism of glycine, sulfur-containing amino acids, tryptophan and phenylalanine Fat and cholesterol metabolism ß-oxidation and biosynthesis of saturated and monounsaturated fatty acids. Carnitine shuttle.	6 7	**Theory** **CC13:** Abnormalities in menstrual cycle. Onset of menopause and post-menopausal changes, Postmenopausal syndromes. — — — —	2 2
Apr	**Theory** **Course Code: PHSL2011** Revision and Question Answer discussion **Practical:** **Course Code: PHSL2051** Estimation of Serum cholesterol.	4	**Theory** **CC8:** Metabolism of Triglycerides. Biosynthesis of Lecithin, Cephalin and Cholesterol. Metabolism of Adipose Tissue. Role of lipoproteins in transport and storage of lipids. Formation of Reactive Oxygen Species (ROSs) and the role of Catalase, Superoxide Dismutase, Glutathione Peroxidase and Glutathione Reductase in combating oxidative stress– role of vitamins.	2 4 4	**Theory** **DSE3B:** Genes - definition. DNA- structure, DNA replication, Transcription of RNA in prokaryotes, Genetic code – properties and wobble hypothesis,	5 2 2
May	**Theory** **Course Code: PHSL2011** Revision **Practical:** **Course Code: PHSL2051** Practice	4	**Theory** **CC8:** Integration of carbohydrate, fat and protein metabolism Biological oxidation– Redox Potential. Mitochondrial Electron Transport Chain. Oxidative Phosphorylation–Inhibitors and uncouplers. Practice	2 6 4	**Theory** **DSE3B:** translation in prokaryotes, regulation of gene expression – operon concept: lac operon, gene mutation DNA repairing processes. Basic idea of Recombinant DNA technology and its applications, Polymerase chain reaction (PCR) - basic concepts.	8 8
June	**Examination**		**Theory** **CC8:** **Revision** **Practice** **Examination**	2 2	**Theory** **CC13:** **Revision** **Class test** **Examination**	4 2

Month		Hours		Hours		Hours
Feb	**Theory** **Course Code: PHSL2011** White Blood Cells – Morphology, classification, life cycles, functions, Human leucocyteantigen (HLA).Leucopoiesis, Arneth index. **Practical:** **Course Code: PHSL2051** Discussion on Principle and application of colorimeter and spectrophotometer	4 2	**Theory** **CC8:** Glycogenesis and Glycogenolysis. Protein metabolism Amino acids, Amino acid pool. Deamination, transamination, amination and decarboxylation. Synthesis of Urea and Nitric oxide. Basic idea of glucogenic and ketogenic amino acids.	4 4 4 2	**Theory** **CC13:** Menstrual cycle and its regulation b. Ovarian Hormones c. Control of Ovarian Function d. Abnormalities of Ovarian Function	10
Mar	**Theory** **Course Code: PHSL2011** Revision and Question Answer discussion **Practical:** **Course Code: PHSL2051** Estimation of Serum cholesterol.	4 4	**Theory** **CC8:** Metabolism of glycine, sulfur-containing amino acids, tryptophan and phenylalanine Fat and cholesterol metabolism ß-oxidation and biosynthesis of saturated and monounsaturated fatty acids. Carnitine shuttle.	6 7	**Theory** **CC13:** Abnormalities in menstrual cycle. Onset of menopause and post-menopausal changes, Postmenopausal syndromes.	2 2
Apr	**Theory** **Course Code: PHSL2011** Revision and Question Answer discussion **Practical:** **Course Code: PHSL2051** Estimation of Serum cholesterol.	4	**Theory** **CC8:** Metabolism of Triglycerides. Biosynthesis of Lecithin, Cephalin and Cholesterol. Metabolism of Adipose Tissue. Role of lipoproteins in transport and storage of lipids. Formation of Reactive Oxygen Species (ROSs) and the role of Catalase, Superoxide Dismutase, Glutathione Peroxidase and Glutathione Reductase in combating oxidative stress– role of vitamins.	2 4 4	**Theory** **DSE3B:** Genes - definition. DNA-structure, DNA replication, Transcription of RNA in prokaryotes, Genetic code – properties and wobble hypothesis,	5 2 2
May	**Theory** **Course Code: PHSL2011** Revision **Practical:** **Course Code: PHSL2051** Practice	4	**Theory** **CC8:** Integration of carbohydrate, fat and protein metabolism Biological oxidation– Redox Potential. Mitochondrial Electron Transport Chain. Oxidative Phosphorylation–Inhibitors and uncouplers. Practice	2 6 4	**Theory** **DSE3B:** translation in prokaryotes, regulation of gene expression – operon concept: lac operon, gene mutation DNA repairing processes. Basic idea of Recombinant DNA technology and its applications, Polymerase chain reaction (PCR) - basic concepts.	8 8
June	**Examination**		**Theory** **CC8:** **Revision** **Practice** **Examination**	2 2	**Theory** **CC13:** **Revision** **Class test** **Examination**	4 2

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DEPARTMENT OF PHYSIOLOGY

TEACHING PLAN

HAIMANTI CHATTERJEE
Physiology (General) (July 2023– June 2024)

Month	Sem-I (G)	No. of Lecture	Sem-III (G)	No. of Lecture	Sem-V (G)	No. of Lecture
Jul	**Theory:** **Course Code: PHSL1021** Cell Cycle – Definition, different phases of cell cycles, regulation and check points of cell cycle.	4	**Theory** **CC 1C:** Blood and Body Fluids Blood: composition and functions. Plasma proteins: origin and functions, Plasmapheresis. Bone marrow. Formed elements of blood-their morphology and functions. **Practical:** **Haematological experiments II:** DC of WBC, estimation of haemoglobin	4 2	**Theory** **SEC III: IMMUNOLOGY** Elementary knowledge of innate and acquired immunity**.** **Practical:** **Field Study** Population study of physiological parameters such as height, weight, heart-rate, blood pressure	4 2
Aug	**Course Code: PHSL1021** Cell division a) Mitosis – Phases and significance. b) Meiosis – Phases and significance. c) Special emphasis on homologous, heterologous, chiasma formation, crossing over, recombination and disjunction of chromosome.	6	**Theory** **CC 1C:** Erythropoiesis and leucopoiesis. Haemoglobin: different types of compounds and derivatives. Functions and estimation of haemoglobin. Abnormal haemoglobins-thalassaemia and sickle-cell anaemia. **Practical** **CC 1C:** Blood group determination, Bleeding time and coagulation time.	4 2	**Theory** **SEC III:** Humoral and cell mediated immunity **Practical:** **Field Study:** Population study of physiological parameters such as height, weight, heart-rate, blood pressure	4 2
Sept	**Theory:** **Course Code: PHSL1021** Revision and Question Answer discussion	4	**Theory** **CC 1C:** Blood volume and its determination (dye method and Radioisotope method) and regulation. Coagulation of blood: mechanism, factors affecting, procoagulants, anticoagulants, and disorders of coagulation.	4	**Theory** **SEC III:** Vaccination-principles and importance of immunization. A brief idea of antibiotics **Practical:** **Field Study** Population study of physiological parameters such as height, weight, heart-rate, blood pressure respiratory rate, PFI, TC of RBC, estimation of haemoglobin, DC of WBC	4 2
Oct	**Theory:** **Course Code: PHSL1021** Revision and Assessment	4	**Theory** **CC 1C:** Lymph and tissue fluids: composition, formation, and functions**.** **Practical** **CC 1C:** **Practice**	4 2	**Theory** .**SEC III:** Basic principle of immunological detection of Pregnancy.	2

Nov	**Theory:** **Course Code: PHSL1021** Revision	**4**	**Theory** **CC 1C:** Blood groups-ABO and Rh. Blood transfusion-precaution and hazards. Immunological basis of identification of ABO and Rh blood groups **Practical** **CC 1C:** **Practice**	**4** **2**	**Theory** **SEC III:** Revision. Class test	**4**
Dec	**Examination**	**2** **2**	**Theory** **CC 1C:** Anaemia-types (definition and causes). Leucocytosis, leucopoenia and leukaemia. Purpura **Revision** **Practical** **Practice** **Examination**	**4** **2**	**Theory** **SEC III** **Revision** **Practical** **Practice** **Examination**	**4** **2**
	Sem-II (Minor)		**Sem-IV (G)**		**Sem-VI (G)**	
Jan	**Theory** **Course Code: PHSL2021** Bone Marrow – Red and yellow. Blood Cells-their morphology and functions**.**	**4**	**Theory** **CC 1D:** **Endocrine System** Anatomy of endocrine system. Hormones - classification. Basic concept of regulation of hormone actions. Positive and negative Feedback mechanism. Elementary idea of hormone action. Hypothalamus: Basic concept of neurohormone. Hypothalamo hypophyseal tract and portal system. **Practical:** **CC 1D:** Identification of abnormal constituents of urine - glucose, protein, acetone blood and bile salts**.**	**4** **2**	**Theory** **DSE 1B:** **Reproductive Physiology** Primary and accessory sex organs and secondary sex characters. Testis: histology, spermatogenesis, testicular hormones and their functions. **Practical:** **Human Experiments II** Pneumographic recording of respiratory movements along with The effect of drinking of water, talking, forced hyperventilation and breath holding**.**	**4** **2**
Feb	**Theory** **Course Code: PHSL2021** White Blood Cells – Morphology, classification, life cycles, functions, Human leucocyteantigen (HLA).Leucopoiesis, Arneth index.	**4**	**Theory** **CC 1D:** Pituitary: Histological structure, hormones, functions. Hypo and Hyperactive states of pituitary gland. . **Practical:** **CC 1D:** **Practice**	**4** **2**	**Theory** **DSE 1B** Ovary : histology, oogenesis, ovarian hormones and their functions. **Practical:** **Human Experiments II** Measurement of some common anthropometric parameters: stature, weight, eye height, shoulder height, elbow height. Sitting height, elbow rest height(sitting), knee height(sitting),arm reach from wall,	**4** **4** **2**
Mar	**Theory** **Course Code: PHSL2021** Revision and Question Answer discussion	**4**	**Theory** **CC 1D:** Thyroid: Histological structure. Functions of thyroid hormones & thyrocalcitonin. Hypo and hyper-active states of thyroid	**4**	**Theory** **DSE 1B:** Spermatogenesis & Oogenesis–processes and Factors controlling. **Practical:** **Human Experiments II** Measurement of some common anthropometric parameters: Mid -arm circumference, waist circumference, hip circumference, neck circumference, head circumference, chest circumference.	**4** **2**

Apr	**Theory** **Course Code: PHSL2021** Revision and Assessment	4	**Theory** **CC 1D:** **Parathyroid:** Histological structure, functions of parathyroid hormone. Tetany. **Adrenal Cortex**: Histological structure and functions of different hormones. Hypo and hyper-active states of adrenal cortex. Adrenal Medulla: Histological structure and functions of medullary hormones. The relation of adrenal medulla with the sympathetic Nervous system	6	**Theory** **DSE 1B:** Oestrus and menstrual cycles and their hormonal control. Fertilization, implantation and structure and functions of placenta.	4
May	**Theory** **Course Code: PHSL2021** Revision	4	**Theory** **CC 1D:** Pancreas: Histology of islets of Langerhans. Origin and functions of pancreatic hormones. Diabetes mellitus. Brief Idea of the origin and functions of renin-angiotensin, prostaglandins. Erythropoietin and melatonin. Elementary idea of gastrointestinal hormone. .	6	**Theory** **DSE 1B:** Maintenance of pregnancy –role of hormones. Development of mammary gland and lactation-role of Hormones	4
June	**Examination**	2 2	**Theory** **CC 1D:** **Revision** **Practical** **Practice** **Examination**	4 2	**Theory** **DSE 1B:** **Revision** **Practical** **Practice** **Examination**	4 2

Teaching Plan of Dr. Tanmoy Mandal for B.Sc. 3 Years Major in Plant Protection and B.Sc. Plant Protection (General Course) (2023-24) (July 2023 – June 2024)

Month	Sem-I (Major)	No. of Lecture	Sem-III (G)	No. of Lecture	Sem-V (G)	No. of Lecture
Jul	PLPT-1011 Major: Pests and Vectors-I Theory: Introduction of Plant Protection and Its Objective in Agriculture.	3	CC-1C Bionomics, Plant disease and their management Theory: Bionomics and Management of major insect pests of Rice & Sugarcane.	5	DSE-1A Integrated Pest Management Theory: Definition and genesis of Integrated Pests Managements	4
	Pest-Comprehensive definition.	2	Stored grain Pests	4	Practical: Study of sign and symptoms caused by pest.	2
	Practical: Identification of Insect Pests	2	Practical: Preparation of desired strength of Pesticides	2		
	PLPT1031 Multidisciplinary: Vermiculture Theory: Vermi unit preparation for vermicompost	3	SEC-1 Green Pesticides Theory: Definition of green pesticides	2		
	PLPT-1051 SEC- Green Pesticides Theory: Definition of green pesticides / Botanical pesticides	6				
Aug	PLPT-1011 Major: Pests and Vectors-I Theory: Causes of Pest outbreak and losses caused due to Insect pests.	4	CC-1C Bionomics, Plant disease and their management Theory: Bionomics and Management of major insect pests of Mustard, Potato & Cauliflower.	5	DSE-1A Integrated Pest Management Theory: Tools and strategies of IPM- Cultural Control, Physical Control, Mechanical Control, Biological control, Chemical control etc.	10
	Practical: Identification of Insect Pests	2	Common bird pest	2	Practical: Field survey and collection of pest and disease.	2
	PLPT1031 Multidisciplinary: Vermiculture Theory: Types of substrate used for vermicompost preparation	3	Practical: Plant protection equipments; handling of rotary duster, Knapsack sprayer and seed dresser	2		

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	PLPT-1051 SEC- Green Pesticides Theory: Botanical pesticides- Advantage of using botanical insecticides	4	SEC-1 Green Pesticides Theory: Botanical pesticides, Advantage of usuing botanical insecticides	4			
Sept	PLPT-1011 Major: Pests and Vectors-I Theory: Categories of Pests, Major Pests, Minor pests, Monophagous pests, Polyphagous pests with example	3	CC-1C Bionomics, Plant disease and their management Theory: Bionomics and Management of major insect pests of Brinjal, Jute , Gram, Mango, Tea	10	DSE-1A Integrated Pest Management Theory: Integrated Pests managements of Rice, &Wheat crops.	6	
	Pathogenic, Regular and sporadic pests with Example, Concept of vectors with example	2	Practical: Collection of insect pests, common weeds, their identification, preservation	2	Practical: Application of pesticides in crop field	2	
	Practical: Identification of Insect Pests	2	SEC-1 Green Pesticides Theory: preparation of pesticides from neem	4			
	PLPT1031 Multidisciplinary: Vermiculture Theory: How to improve the quality of vermicompost, problem in vermicompost preparation	3					
	PLPT-1051 SEC- Green Pesticides Theory: preparation of pesticides from neem	4					
Oct	PLPT-1011 Major: Pests and Vectors-I Theory:	5	CC-1C Bionomics, Plant disease and their management Theory: Termites-	2	DSE-1A Integrated Pest Management Theory: Integrated Pests managements of Potato	4	

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Month		Hrs		Hrs		Hrs
	Characteristic, Examples, Nature of damage and Symptoms of damage, Management of Molluscan pests (Giant African Snail) Practical: Identification of Insect Pests PLPT1031 Multidisciplinary: Vermiculture Theory: Problem in vermicompost preparation PLPT-1051 SEC- Green Pesticides Theory: preparation of pesticides from tobacco Green pesticides - Method of utilization, mode of action	2 3 6	Examples, Biology and management Practical: Study of symptoms of attack by insect pests SEC-1 Green Pesticides Theory: preparation of pesticides from tobacco Green pesticides, Method of utilization, mode of action	2 4 4	& Mustard Field. Practical: Application of pesticides in crop field.	2
Nov	PLPT-1011 Major: Pests and Vectors-I Theory: Characteristic, Examples, Nature of damage and Symptoms of damage, Management of Birds Pests (Blue rock pigeon, Rose ring parakeet) and rodent pests (Large bandicoot rat) Practical: Field trips for collection of specimens and surveillance.	5 2	CC-1C Bionomics, Plant disease and their management Theory: Rodents (*Bandicota bengalensis*, *Rattus rattus*) and their management Practical: Field trips for collection of specimens and surveillance SEC-1 Green Pesticides Theory: preparation of pesticides from Chrysanthemum Green pesticides and chemical	2 2 4 8	DSE-1A Integrated Pest Management Theory: Integrated Pests Managements of Sugarcane & pulse crops. Practical: Field trips for collection of specimens and surveillance	6 2

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			pesticides			
	PLPT1031 Multidisciplinary: Vermiculture Theory: Uses of vermicompost and Vermiwash in organic farming	3				
	PLPT-1051 SEC- Green Pesticides Theory: preparation of pesticides from Chrysanthemum, Green pesticides and chemical pesticides	10				
Dec	PLPT-1011 Major: Pests and Vectors-I PLPT1031 Multidisciplinary: Vermiculture PLPT-1051 SEC- Green Pesticides Theory and Practical: Special classes + doubt clearing+ discussions		CC-1C Bionomics, Plant disease and their management SEC-1 Green Pesticides Theory and Practical: Special classes + doubt clearing+ discussions		DSE-1A Integrated Pest Management Theory and Practical: Special classes + doubt clearing+ discussions	
	Sem-II (Major)	No. of Lecture	Sem-IV (G)	No. of Lecture	Sem-VI (G)	No. of Lecture
Jan	PLPT-2011 Major: Pests and Vectors-II Theory: Characteristic, Examples, Nature of damage and Symptoms of damage, Management of Nematode (Root Knot Nematode) Practical: Study visit to Agricultural / Horticultural Farm	4 2	CC-1D Plant Defence Mechanism Theory: Resistance of Host Plant to insects. Practical: Field trips for collection of specimens and surveillance. SEC-2 Formulation and application of pesticides and their precautions Theory:	10 2 4	DSE-1B Dissertation (Curriculum based local area survey of pest and crop) Students have to select an Agricultural Crop. They visit the field twice a week. They collected data (details crop cultivation method) from farmers like land preparation, seed sowing, transplanting, nutrient management, water management, harvesting of the crop.	As per student need

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	PLPT2031 Multidisciplinary: Pesticide application Equipments Theory: Pesticide formulation, different types of formulation, concept about technical grade pesticide and pesticide formulation	3	Formulation of pesticides Sprayer and duster	4	Identification of insect pests, bio-control agent of the crop and their management. Helping students to prepare report.	
	PLPT-2051 SEC- Pest survey and surveillance Theory: Definition and need, Ecological characterization of an area	5				
Feb	PLPT-2011 Major: Pests and Vectors-II Theory: Characteristic, Examples, Nature of damage and Symptoms of damage, Management of Mite (Yellow mite of Chili)	3	CC-1D Plant Defence Mechanism Theory: Physiological inhibitors and feeding deterrents	2		
	Practical: Permanent slide preparation.	2	Practical: Study of structural defences in plants- Trichome	2		
	PLPT2031 Multidisciplinary: Pesticide application Equipments Theory: Different types of solid formulation and liquid formulation	3	SEC-2 Formulation and application of pesticides and their precautions Theory: Solid formulation	4		
			Sprayer -cum-duster, aerosol generator	4		
	PLPT-2051 SEC- Pest survey and surveillance Theory: importance of surveillance	5				

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Mar	PLPT-2011 Major: Pests and Vectors-II Theory: Characteristic, Examples, Nature of damage and Symptoms of damage, Management of Insect (Rice Yellow Stem borer)	3	CC-1D Plant Defence Mechanism Theory: Ovipositional stimulants and deterrents, feeding stimulants	4		
	Practical: Permanent slide preparation.	2	Practical: Plant protection equipment; parts and handling of Rotary Duster.	2		
	PLPT2031 Multidisciplinary: Pesticide application Equipments Theory: Different types of gaseous formulation, prepared desired strength of pesticides and showing method of calculation	4	SEC-2 Formulation and application of pesticides and their precautions Theory: Liquid formulation	4		
			Soil injector, seed dressing machine	4		
	PLPT-2051 SEC- Pest survey and surveillance Theory: kind of survey, qualitative survey and quantitative survey	5				
Apr	PLPT-2011 Major: Pests and Vectors-II Theory: Migration of Locust and Phase theory of locust, Origin of new locust cycle.	5	CC-1D Plant Defence Mechanism Theory: Host Plant Nutrients and Insects Resistance	10		
	Practical: Permanent slide preparation.	2	Practical: Plant protection equipment; parts and handling of knapsack sprayer.	2		
	PLPT2031	5	SEC-2 Formulation	3		

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	Multidisciplinary: Pesticide application Equipments Theory: Precaution of pesticide handling during storage.		and application of pesticides and their precautions Theory: Gaseous formulation			
	PLPT-2051 SEC- Pest survey and surveillance Theory: method of survey, selection of field, recording data on survey, analysis of data, preparation of survey reports	7				
May	PLPT-2011 Major: Pests and Vectors-II Theory: Nature of damage and management of Locust, anti locust organization	5	CC-1D Plant Defence Mechanism Theory: Allelochemicals decreasing nutrients bioavailability, Plant breeding for insect resistance	4		
	Practical: Permanent slide preparation.	2				
	PLPT2031 Multidisciplinary: Pesticide application Equipments Theory: Precaution of pesticide handling during formulation and application in agricultural crop field	5	Practical: Plant protection equipment; parts and handling of hand compression sprayer and seed dresser	2		
			SEC-2 Formulation and application of pesticides and their precautions Theory: Precaution	3		
	PLPT-2051 SEC- Pest survey and surveillance Theory: sampling procedure, random sampling and assessments of pest populations and injury	8				
June	PLPT-2011		CC-1D Plant			

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	Major: Pests and Vectors-II PLPT2031 Multidisciplinary: Pesticide application Equipments . PLPT-2051 SEC- Pest survey and surveillance Theory and Practical: Special classes + doubt clearing+ discussions		Defence Mechanism SEC-2 Formulation and application of pesticides and their precautions Theory and Practical: Special classes + doubt clearing+ discussions		

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Month	SEM I MAJOR	NO. of lecture	SEM I ID VERMICULTURE	No of lecture	SEM III (G)	NO OF LECTURE	SEM –V (G)	NO OF LECTURE
JULY	Pest and vector 1 Plant diseases according to their different mode. Brief account of bacteria and bactiriea like organism. Economic importance of bactiria .	8	Unit 1:- Definition of verm compost difference between compost and vermi compost (Eiseamia foedi dr)	8	Theory Unit-1 Predisposition and Epidemiological Factors	4	Theory Dse-ia integrated Pest Management Unit-2 Tools & Strategies of 1pm A) Cultural Control B) Physical Control c) Practical:- Study of Sign & Symptoms Caused By pest	4
August	Fungi and fungi like organisim Brief account of Algae and like organism Economic importance	7	Unit-2 Factor of beting Earth warm activity and propagation	7	Theory-Unit 2 Symptoms, Etology, Disease Cycle & Management of Major Plant	8	Theory-Unit 2 Mechanical Control Practical:- Identification	9

	of fungi. Practical:- Indification of plant diseases: blast of rice, BLB	2				Disease of Rice Wheat sugarcane Potato tea Practical – Isolation of casual organism		of Plant diseases	
Septem eber	Disease triangle Disease pyramid, viroids and mollecutes. Practical- Identification of vendi mosaic disease.	7 2	Revision			Unit -2 Disease of mustard tomato ground nut jute banana. Unit-3 Seed pathology seed Deterioration Practical:- collection of common weeds	8 3	Chemical control Theory- Genetic Control legislative control	10 9
October	Major types of plant disease symptoms, casaued by fungi, bacteria,virus. Practical :- hoogley wilt of jute,jute apion.	6 2				Unit -3 Seed transmission strategy and methods of management Practical –Study tour	2	Theory- Appropriate IPM Methods with example rice field wheat field.	8
Novem ber	Revision					Unit-4 Post harvest disease and perishables loss	4	Theory: Appropriate IPM methods	8

					disease of fruits vegitable (One)		with example from potato field field survey	
Decemb er	Revision				Unit -5 Weed classification examples and management	4	Appropriate 1pm sugarcane field pulse field Practical: Study tour	8

DEPATMENT OF PLANT PROTECTION

Teaching plan of Dr PAPIA MANDAL (RAHA)

PLANT PROTECTION MAJOR, Mulidisiplinary (2023-2024) July 23-June24, Sem IV, Sem VI

Month	SEM II MAJOR FEST AND RECTOR II	No of Lectures	SEM I ID	NO OF LECT URES	SEM IV (G)	No of Lectures	Sem VI (G)	No. of Lectures
January	Unit-3 Dissemination of Plant Pathogen Soil borne,seed borne Plant diseases. Practical- Study visit to Agricultural field	7 2	Pesticides Application equipments Unit-2 Different types of comporents i) Sprayer,duster. ii) Spryer and duster and their applications	5	Theory – Unit-1 preinfectional Defence mechanism	4 4	Dissertation curriculum based local area survey of paste & crop. Introductory Class on Dissertation topic	
February	Unit-2 Air borne and water borne plant diseases Unit-3. Mode of trangem ssior of virus and their common vectors Praticals- Slide preparation of patnogenic	6 2	Different types of components iv)Soil injector v)Seed dressing machine and their applications	5	Theory : Unit 3:Structurla defence: Development of cork layer deposition of Gums formation of Pyloses, formation of abscission layer practical	8	Distribution among the students. Discussion on the main objectives of the dissertation. Discussion on the procedure I.E how to execute the allotted project topic. Visit the different fileds of the seasonal	Field Visit: Day-1, Day-2, Day-3, Day-4, Day-5, Day-6 , Day-7

	fungus							
March	Unit-4 Epidemiology, Endemic, Epidemic Pandemic and sporadic diseases Practical Slide preparation	5 2	Grandle applicator aerosoil genetor and their function Revision	4 5	Theory Unit-3 Cellular defence mechanism defence through hyper Sensitivity Practical: Estimate of total phenol from healthy plant	8	Crop fields along with our students. Collection of data from the fields	
April	Monocylic and poly cyclic diseases. strategy of management	5	M.C.Q practicing	4	Theory-4 Role of phytolexins in defence mechanism Practical: Study of structural defence in plants	6	Discussion on the writing pattern of the project topic	11
May	Strategy of management	5	Same as above	5	Theory-Unit 5: Basic idea about toxins of pathogens Pratical : Study of structural defence in plants	4		

June	Revision		Revision	4	Theory-All syllabus	6		

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THEORY

2023-2024

(NEP) SEM -1 MAJOR (JULY - DECEMBER)

Non-Chordate	CLASS	TEACHER
Unit 1: Basics of Animal Classification Definition: Classification, Systematics, and Taxonomy, Code of Zoological Nomenclature.	2	AD
Unit 2: Protista and Metazoa **Protozoa:** General Characteristics and Schematic Classification up to phylum (Levine et al. 1980) Locomotion in *Amoeba*, Conjugation in *Paramoecium*	5	DRB
Unit 3: Porifera General characteristics and schematic classification upto order	5	DRB
Unit 4: Cnidaria General characteristics and classification upto class, metagenesis, coral reefs	4	AD
Unit 5: Ctenophora General characteristics	1	AD
Unit 6: Platyhelminthes General characterics and classification upto class	2	AD
Unit 7:Nematoda General characterics and classification upto class	2	AD
Unit 8: Annelida General characterics and classification upto class, metamerism, anephridia structure and function	4	UKS
Unit 9: Arthropoda General characterics and classification upto class, vision, metamorphosis	6	UKS
Unit 10: Onychophora-Evolutionary significance	2	UKS
Unit 11: Mollusca General characterics and classification upto class	5	AD
Unit 12: Echinodermata General characterics and classification upto class	4	DRB
Unit Hemichordata General characteristics	3	UKS

PRACTICAL (MAJOR)

2023-2024

SEM -1 (JULY – DECEMBER)

Non- Chordates	CLASS	TEACHER
Spot identification of *Amoeba , Euglena* and *Paramoecium*	3	DM
Spot Identification of *Sycon*, Neptune′s Cup	3	DM
Spot Identification of *Obelia*, *Pennatula*, *Fungia*	4	DM
Spot Identification and significance of adult *Taenia solium* and *Ascaris lumbricoides.*	3	DM
Dissection- Digestive and nervous system of cockroach	4	DM
Mounting of mouth parts of cockroach, whole mount	3	DM

THEORY (MINOR)

2023-2024

(NEP) SEM -1 (JULY - DECEMBER)

Non-Chordate	CLASS	TEACHER

Unit 1: Basics of Animal Classification
  Definition: Classification, Systematics, and Taxonomy,
  Code of Zoological Nomenclature.
	2	AD

Unit 2: Protista and Metazoa
  Protozoa: General Characteristics and Schematic
    Classification up to   phylum (Levine   et al. 1980)
  Locomotion in *Amoeba*, Conjugation in *Paramoecium*
	5	DRB

Unit 3: Porifera General characteristics and schematic classification upto order	5	DRB
Unit 4: Cnidaria General characteristics and classification upto class, metagenesis, coral reefs	4	AD
Unit 5: Ctenophora General characteristics	1	AD
Unit 6: Platyhelminthes General characterics and classification upto class	2	AD
Unit 7:Nematoda General characterics and classification upto class	2	AD
Unit 8: Annelida General characterics and classification upto class, metamerism, anephridia structure and function	4	UKS
Unit 9: Arthropoda General characterics and classification upto class, vision, metamorphosis	6	UKS
Unit 10: Onychophora-Evolutionary significance	2	UKS
Unit 11: Mollusca General characterics and classification upto class	5	AD
Unit 12: Echinodermata General characterics and classification upto class	4	DRB
Unit Hemichordata General characteristics	3	UKS

PRACTICAL (MINOR)

2023-2024

SEM -1 (JULY – DECEMBER)

Non- Chordates	CLASS	TEACHER
Spot identification of *Amoeba , Euglena* and *Paramoecium*	3	A.Ali
Spot Identification of *Sycon*, Neptune's Cup	3	A.Ali
Spot Identification of *Obelia*, *Pennatula*, *Fungia*	4	A.Ali
Spot Identification and significance of adult *Taenia solium* and *Ascaris lumbricoides.*	3	A.Ali
Dissection- Digestive and nervous system of cockroach	4	A.Ali
Mounting of mouth parts of cockroach and any zooplankton	3	A.Ali

THEORY-SEC

2023-2024

(NEP) SEM -1 MAJOR (JULY - DECEMBER)

Apiculture	CLASS	TEACHER
History and importance of apiculture	3	DM
The life cycle of honeybee, general morphology and anatomy of different castes of honeybees	4	DM
Structure of different bee hives, bee language communication	3	DM
Methods of bee keeping	2	DM
Apiar: selection of good apiary site, selection of good bee	2	SB
Modern methods of apiculture, discovery of the movable hive, equipments, extraction of honey	4	DM
Products of apiculture	3	SB
Diseases and enemies	3	SB
Economics of beekeeping	3	CM
Entrepreneurship in apiculture	3	CM

THEORY-MD

2023-2024

(NEP) SEM -1 (JULY - DECEMBER)

Introduction to animalia	CLASS	TEACHER
Unit 1: Brief idea about animal kingdom	2	AD
Unit 2: Outline classification and general basic characters of Phylum Porifera, Cnidaria, Platyhelminthes, Nematohelminthyes, Annilida, Arthropoda, Mollusca, Echinodermata	16	DRB
Unit 3: General features of classes Pisces, Amphibia, Reptilia, Aves and Mammals	12	AD
Unit 4: basic idea of life cycle of butterfly and any one common carp	2	AD
Unit 5: basic idea about ecosystem, population, community, habits and habitat, types of adaptations	5	DRB
Unit 6: overview of different interactions among animals	8	AD

THEORY (MAJOR)

2023-2024

SEM -II (JANUARY-JUNE)

Chordate	CLASS	TEACHER
Origin of Chardata	**2**	
Introduction to Chordata	**8**	
General features and classification upto classes of Agnathans	**6**	
General features and classification upto Sub-classe. Accessory respiratory organs in fishes **Osmoregulation in fishes**	**6**	
General features and outline classification up to subclasses of Amphibia. Metamorphosis and parental care in amphibia	4	
General features and outline classification up to subclasses of Reptilia, poison apparatus and biting mechanism	6	
General features and outline classification up to subclasses of Aves, Migration in birds	5	
General features and outline classification up to subclasses of Mammalia, exoskeleton, Echolocation, adaptive radiation in mammals	10	
Zoogeographical realms	**4**	

PRACTICAL (MAJOR)

2023-2024

SEM -II (JANUARY-JUNE)

Chordate	CLASS	TEACHER
Spot identification	3	CM
Temporary staining and mounting of Cycloid and Ctenoid scales	6	CM
Identification of Poisonous and non-poisonous snakes	4	CM
Powerpoint presentation	2	CM

THEORY (MINOR)

2023-2024

SEM -II (JANUARY-JUNE)

Chordate	CLASS	TEACHER
Origin of Chardata	**2**	**AD**
Introduction to Chordata	**2**	**AD**
General features and classification upto classes of Agnathans	**1**	**AD**
General features and classification upto Sub-classe. Accessory respiratory organs in fishes **Osmoregulation in fishes**	**8**	**UKS**
General features and outline classification up to subclasses of Amphibia. Metamorphosis and parental care in amphibia	8	AD
General features and outline classification up to subclasses of Reptilia, poison apparatus and biting mechanism	8	DRB
General features and outline classification up to subclasses of Aves, Migration in birds	8	DRB
General features and outline classification up to subclasses of Mammalia, exoskeleton, Echolocation, adaptive radiation in mammals	8	UKS

PRACTICAL (MINOR)

2023-2024

SEM -II (JANUARY-JUNE)

Chordate	CLASS	TEACHER
Spot identification	3	CM
Temporary staining and mounting of Cycloid and Ctenoid scales	6	CM
Fish market survey	4	CM

THEORY-SEC 2

2023-2024

(NEP) SEM -II MAJOR (JANUARY-JUNE)

Aquarium Fishkeeping	CLASS	TEACHER
INTRODUCTION TO AQUARIUM FISH KEEPING	2	DRB
Types of Quaria	6	SB
Biology of Aquarium fish	2	DRB
Aquarium fishes	6	DRB
Food and feeding of Aquarium Fishes	4	SB
Maintenance of Aquarium	2	SB
Fish Transportation	3	SB
Aquarium fish Diseases	2	SB
Maintenamnce	2	CM
Breeding habits	1	CM

THEORY-MD-2

2023-2024

(NEP) SEM -II MAJOR (JANUARY-JUNE)

Topics	CLASS	TEACHER
Chapter 1. Sericulture Chapter 2. Apiculture	15	DRB DM

THEORY (CC-5)

2023-2024

SEM -III (JULY- DECEMBER)

CHORDATES	CLASS	TEACHER
Unit 1: Introduction to Chordates General characteristics and outline classification of Phylum Chordata	2	DP
Unit 2: Protochordata. General characteristics and classification of sub-phylum Urochordata and Cephalochordate up to Classes. Retrogressive metamorphosis in *Ascidia*. Chordate Features and Feeding in *Branchiostoma*	6	DM
Unit 3: Origin of Chordata .Dipleurula concept and the Echinoderm theory of origin of chordates Advanced features of vertebrates over Protochordata	2	DM
Unit 4: Agnatha General characteristics and classification of cyclostomes up to order	2	DM
Unit 5: Pisces General characteristics and classification of Chondrichthyes and Osteichthyes up to Subclasses Accessory respiratory organ, migration and parental caring fishes Swim bladder in fishes.	6	DM
Unit 6: Amphibia General characteristics and classification unto living Orders. Metamorphosis and parental care in Amphibia	6	UKS
Unit 7: Reptilia General characteristics and classification up to living Orders. Poison apparatus and Biting mechanism in Snake	8	UKS
Unit 8: Aves General characteristics and classification up to Sub-Classes Exoskeleton and migration in Birds Principles and aerodynamics off flight	8	UKS
Unit 9: Mammals General characters and classification up to living orders Affinities of Prototheria Exoskeleton derivatives of mammals Adaptive radiation in mammals with reference to locomotory appendages Echolocation in Micro-chiropterans and Cetaceans	8	TR
Unit 10: Zoogeography Zoogeographical realms, Plate tectonic and Continental drift theory, distribution of birds and mammals in different realms	2	TR

PRACTICAL (CC-5)

2023-2024

SEM -III (JULY- DECEMBER)

CELL BIOLOGY	CLASS	TEACHER
Spot identification of a. Protochordata : *Balanoglossus, Herdmania, Branchiostoma* b. Agnatha: *Petromyzon, Myxine* c. Fishes: *Scoliodon,Sphyrna,Pristis, Torpedo, Chimaera, Mystus, Heteropneustes,Labeo,* *Catla, Cirrhinus, Hypopthalmichthys, Cyprinus, Ctenopharyngodon, Exocoetus, Echeneis, Anguilla,* *Hippocampus,Tetrodon/Diodon,Anabas,Clarias* d. Amphibia: *Necturus, Bufo, Hyla, Alytes, Axolotl* larva, *Tylototriton* e. Reptilia: *Chelone, Trionyx, Hemidactylus, Varanus, Uromastix, Mabuya, Draco, Bungarus,* *Vipera, Naja, Hydrophis* f. Mammalia: Bat (Insectivorous and Frugivorous), *Funambulus*	10	CM
Key for Identification of poisonous and non-poisonous snake	2	DM
. Mounting of Pecten from Fowl head	4	DM
Dissection of brain and pituitary of any major carp .	4	DM
Power point presentation on study of any two animals from two different classes by students (may be included if dissections not permitted). Power point submission & demonstration through laptop.	4	UKS

THEORY (CC-6)

2023-2024

SEM -III (JULY- DECEMBER)

Animal Physiology: Controlling& Coordinating Systems	CLASS	TEACHER
Unit1:Tissues Structure, location, classification and functions of epithelial tissue, connective tissue, muscular tissue and nervous tissue	4	CM
Unit2:Bone and Cartilage Structure and types of bones and cartilages, Ossification	4	AD
Unit3:NervousSystem Structure of neuron, resting membrane potential, Origin of action potential and its propagation across the myelinated and unmyelinated nerve fibers. Types of synapse, Synaptic transmission and Neuro-muscular junction; Reflex action and its types	10	DRB
Unit4:Muscular system Histology of different types of muscle; Ultrastructure of skeletal muscle; Molecular and chemical basis of muscle contraction; Characteristics of muscle fibre	10	CM
Unit5:ReproductiveSystem Histology of testis and ovary Physiology of Reproduction (Estrus and Menstrual cycle)	6	CM
Unit6:Endocrine System Histology and function of pituitary, thyroid, pancreas and adrenal Classification of hormones; Mechanism of Hormone action: Signal transduction pathways for Steroidal and Nonsteroidal hormones Hypothalamus (neuroendocrine gland) – principal nuclei involved in neuroendocrine control of anterior pituitary and endocrine system Placental hormones	16	AD

PRACTICAL (CC-6)

2023-2024

SEM -III (JULY- DECEMBER)

Animal Physiology: Controlling &Coordinating Systems	CLASS	TEACHER
Recording of simple muscle twitch with electrical stimulation(or Virtual	2	UKS
Demonstration of the unconditioned reflex action(Deep tendon reflex such as knee jerk reflex)	4	CM
Preparation of temporary mounts: Squamous epithelium, Striated muscle fibres	6	CM
Identification of permanent slides of Mammalian Cartilage, Bone, Pituitary, Liver, Kidney,Intestine, Lung, Pancreas, Testis, Ovary, Adrenal, Thyroid	4	UKS
Microtomy: Preparation of permanent slide of any five mammalian(Goat/white rat)tissues	8	UKS

THEORY (CC-7)
2023-2024

SEM -III (JULY- DECEMBER)

Fundamentals of Biochemistry	CLASS	TEACHER
Unit1:Carbohydrates .Structure and Biological importance: Monosaccharides, Disaccharides, Polysaccharides;Derivatives of Monosachharides .Carbohydrate metabolism: Glycolysis, Citric acid cycle, Pentose phosphate pathway,Gluconeogenesis	8	TR
Unit2:Lipids Structure and Significance: Physiologically important saturated and unsaturated fatty acids, Tri- acyl glycerols, Phospholipids, Sphingolipid, Glycolipids, Steroids, Eicosanoids and terpinoids. . Lipid metabolism: β-oxidation of fatty acids; Fatty acid biosynthesis	7	DRB
Unit3:Proteins . Amino acids : Structure, Classification, General and Electrochemical properties of α-amino acids; Physiological importance of essential and non-essential amino acids . Proteins: Bonds stabilizing protein structure; Levels of organization . Protein metabolism: Transamination, Deamination, Urea cycle, Fate of C-skeleton of Glucogenic and Ketogenic amino acids	10	TR
Unit4:NucleicAcids Structure: Purines and pyrimidines, Nucleosides, Nucleotides, Nucleic acids . Types of DNA and RNA, Complementarity of DNA, Hypo-Hyper chromaticity of DNA . Basic concept of nucleotide metabolism	10	DRB
Unit5:Enzymes . Nomenclature and classification; Cofactors; Specificity of enzyme action; Isozymes . Mechanism of enzyme action; Enzyme kinetics; Derivation of Michaelis- Menten Equation, Lineweaver-Burk plot; Factors affecting rate of enzyme- catalyzed reactions; Enzyme inhibition; Allosteric enzymes and their Factors affecting rate of enzyme-catalyzed reactions; . Enzyme inhibition; Allosteric enzymes and their kinetics; Strategy of enzyme action- . Catalytic and Regulatory	13	DRB
Unit 6: Oxidative phosphorylation	2	DRB

PRACTICAL (CC-7)

2023-2024

SEM -III (JULY- DECEMBER)

Fundamentals of Biochemistry	CLASS	TEACHER
Qualitative tests of functional groups in carbohydrates (Benedict's test), proteins (Biuret's test)and lipids (Saponification number).	4	DRB
Paper chromatography of amino acids	4	TR
Quantitative estimation of protein by Lowry Method	4	BPR
Demonstration of protein separation by SDS-PAGE	4	DM
To study the enzymatic activity of Salivary amylase and Catalase in *Cajanus cajan*	6	DRB

THEORY (SEC-1)
2023-2024

SEM –III (JULY- DECEMBER)

Apiculture	CLASS	TEACHER
Unit1:Biology of Bees . History, Classification and Biology of Honey Bees . Social Organization of Bee Colony	2	DM
Unit2:Rearing of Bees Artificial Beer earing(Apiary),Beehives–Newton and Langstroth . Bee Pasturage . Selection of Bee Species for Apiculture . Bee Keeping Equipment . Methods of Extraction of Honey (Indigenous and Modern)	10	DM
Unit3:Diseases and Enemies Bee Diseases and Enemies, Control and Preventive measures	5	SB
Unit4:Bee Economy Products of Apiculture Industry and its Uses(Honey, Bees Wax, Propolis), Pollenetc	2	SB
Unit5:Entrepreneurshipin Apiculture Bee Keeping Industry–Recent Efforts, Modern Methods in employing artificial Beehives for cross pollination in horticultural gardens	6	CM

THEORY (CC-8)

2023-2024

SEM -IV (JANUARY-JUNE)

Comparative Anatomy of Vertebrates	CLASS	TEACHER
Unit1:Integumentary System Structure, function and derivatives of integument in amphibian, birds and mammals	6	CM
Unit2:SkeletalSystem Overview of axial and appendicular skeleton; Jaw suspension; Visceral arches	6	CM
Unit3:DigestiveSystem . Comparative anatomy of stomach. . Dentition in mammals	8	UKS
Unit4:Respiratory System Respiratory organs in fish, amphibian, birds and mammals	6	UKS
Unit5:CirculatorySystem General plan of circulation, Comparative account of heart and aortic arches	8	CM
Unit6:UrinogenitalSystem . Succession of kidney, . Evolution of urino-genital ducts, . Types of mammalian uteri	6	CM
Unit7:NervousSystem . Comparative account of brain, . Cranial nerves in mammals	6	UKS
Unit8:Sense Organs . Classification of receptors, . Brief account of auditory receptors invertebrate	4	SB

PRACTICAL (CC-8)

2023-2024

SEM -IV (JANUARY-JUNE)

Comparative Anatomy of Vertebrates	CLASS	TEACHER
Mounting of cycloid and ctenoid scales	6	CM
Study of disarticulated skeleton of Toad, Pigeon and Guineapig	6	CM
Demonstration of Carapace and plastron of turtle from model/chart	4	UKS
Identification of mammalian skulls:One herbivorous(Guineapig) and one carnivorous animal (Dog)	4	UKS
Study and Dissection of Afferent arterial system, brain, pituitary in Carp	4	CM

THEORY (CC-9)
2023-2024

SEM -IV (JANUARY-JUNE)

Animal Physiology: Life Sustaining Systems	CLASS	TEACHER
Unit1:Physiology of Digestion . Structural organization and functions of Gastrointestinal tract and Associatedglands; . Mechanical and chemical digestion of food, . Absorption of Carbohydrates, Lipids, Proteins and Nucleic Acids; . Digestive enzymes	8	TR
Unit2:Physiology of Respiration . Mechanism of Respiration, . Respiratory volumes and capacities, . Transport of Oxygen and Carbon dioxide in blood ,Dissociation curves and the factors influencing it, . Respiratory pigments. . Carbon monoxide poisonin	8	TR
Unit3:Physiology of Circulation . Components of Blood and their functions ;Structure and functions of haemoglobin . Homeostasis; Blood clotting system, Fibrinolytic system . Haemopoiesis; Basic steps and its regulation . Blood groups; ABO and Rh factor	12	AD
Unit4:Physiology of Heart . Structure of mammalian heart, . Coronary Circulation, . Structure and working of conducting myocardial fibres, . Origin and conduction of cardiac impulses . Cardiac Cycle and cardiac output . Blood pressure and its regulation	8	AD
Unit5:Thermoregulation&Osmoregulation . Physiological classification based on thermal biology. . Thermal biology of endotherms . Osmoregulation in aquatic vertebrates . External osmoregulatory organs invertebrates	6	UKS
Unit6:RenalPhysiology	8	UKS

PRACTICAL (CC-9)
2023-2024

SEM -IV (JANUARY-JUNE)

Animal Physiology: Life Sustaining Systems	CLASS	TEACHER
Determination of ABO Blood group	4	TR
Enumeration of red blood cells and white blood cells using haemocytometer	6	TR
Estimation of haemoglobin using Sahli's haemoglobinometer	6	UKS
Preparation of haem in crystals	4	UKS
Recording of blood pressure using a sphygmomanometer	4	UKS

THEORY (CC-10)
2023-2024

SEM -IV (JANUARY-JUNE)

Immunology	CLASS	TEACHER
Unit1: Overview of Immune System . Basic concepts of health and diseases, . Historical perspective of Immunology, . Cells and organs of the Immune system	2	DM
Unit2:Innate and Adaptive Immunity . Anatomical barriers, . Inflammation, . Cell and molecules involved in innate immunity, Adaptive immunity (Cell mediated and humoral).	8	DM
Unit3:Antigens . Antigenicity and immunogenicity, Immunogens, Adjuvants and haptens, . Factors influencing immunogenicity, . Band T-Cell epitopes	4	DRB
Unit4:Immunoglobulins . Structure and functions of different classes of immunoglobulins, . Antigen- antibody interactions, . Immunoassays (ELISA and RIA), . Hybridoma technology, Monoclonal antibody production	8	DRB
Unit5:MajorHistocompatibilityComplex . Structure and functions of MHC molecules. . Structure of Tcell Receptor and its signalling, . Tcell development &selection	6	DM
Unit6:Cytokines Types, properties and functions of cytokines.	2	DRB
Unit7:ComplementSystem Components and pathways of complement activation	6	DM
Unit8:Hypersensitivity Gell and Coombs' classification and brief description of various types of hypersensitivities	4	DM
Unit9:Immunology of diseases Malaria, Filariasis, Dengue and Tuberculosis	6	DRB
Unit10:Vaccines Various types of vaccines. Active & passive immunization (Artificial and natural).	4	DRB

PRACTICAL (CC-10)
2023-2024

SEM -IV (JANUARY-JUNE)

Immunology	CLASS	TEACHER
Demonstration of lymphoid organs in human through model/ photograph.	2	DM
Histological study of spleen, thymus and lymph nodes through slides/photographs	4	DM
Preparation of stained blood film to study various types of blood cells	4	DM
Total count (TC) & Differential count (DC) of WBC	6	DRB
Demonstration of ELISA by available teaching kit	4	DRB

THEORY (SEC-2)
2023-2024

SEM -IV (JANUARY-JUNE)

Aquarium fish keeping	CLASS	TEACHER
Unit1: Introduction to Aquarium Fish Keeping	**2**	**DM**
Unit2: Biology of Aquarium Fishes Common characters and sexual dimorphism of Freshwater and Marine Aquarium fishes such as Guppy, Molly, Swordtail, Goldfish, Angel fish ,Bluemorph, Anemone fish and Butterfly fish	**10**	**DM**
Unit3:Food and feeding of Aquarium fishes . Use of live fish feed organisms. . Preparation and composition of formulated fish feeds, . Aquarium fish as larval predator	**7**	**CM**
Unit 4: Fish Transportation Live fish transport- Fish handling, packing and forwarding techniques.	**3**	**UKS**
Unit5: Maintenance of Aquarium General Aquarium maintenance – budget for setting up an Aquarium Fish Farm as a Cottage Industry	**3**	**UKS**

THEORY (CC-11)
2023-2024

SEM -V (JULY- DECEMBER)

Molecular biology	CLASS	TEACHER
Unit1:Nucleic Acids Salient features of DNA and RNA Watson and Crick Model of DNA	3	UKS
Unit2:DNA Replication mechanism of DNA Replication in Prokaryotes, Semi-conservative, bidirectional and discontinuous Replication, RNA priming, 2. Replication of telomeres	9	UKS
Unit3:Transcription Mechanism of Transcription in prokaryotes and eukaryotes, Transcription factors, Difference between prokaryotic and eukaryotic transcription	7	UKS
Unit4:Translation Mechanism of protein synthesis in prokaryotes, Ribosome structure and assembly in prokaryotes, fidelity of protein synthesis, aminoacyl tRNA synthetases and charging of tRNA; Proteins involved in initiation, elongation and termination of polypeptide chain; Genetic code, Degeneracy of the genetic code and Wobble Hypothesis; Inhibitors of protein synthesis; Difference between prokaryotic and eukaryotic translation	6	CM
Unit5:PostTranscriptionalModificationsandProcessingofEukaryoticRNA Capping and Poly A tail formation in mRNA; Split genes: concept of introns and exons, splicing mechanism, alternative splicing, Exon shuffling, and RNA editing, Processing of tRNA	8	CM
Unit6:Gene Regulation Regulation of Transcription in prokaryotes: *lac* operon and *trp* operon; Regulation of Transcription in eukaryotes: Activators, enhancers, silencer, repressors, miRNA mediated gene silencing, Genetic imprinting	7	CM
Unit7:DNA Repair Mechanisms	4	CM
Unit8: Principles of Molecular Techniques	6	UKS

PRACTICAL (CC-11)
2023-2024
SEM -V (JULY-DECEMBER)

Molecular Biology	CLASS	TEACHER
Preparation of polytene chromosome from Diptera (*Chironomus/ Drosophila/ Mosquito larva*)	4	UKS
Identification of polytene and lampbrush chromosome from photograph	2	UKS
Isolation and quantification of genomic DNA using spectrophotometer (A260 measurement) (demonstration only)	2	UKS
Demonstration of agarose gel electrophoresis for DNA	4	CM
Study and interpretation of electron micrographs/ photographs showing a) DNA replication b) Transcription c) Split genes	4	CM
Preparation of liquid and solid bacterial culture media, slant and stab	6	UKS
Demonstration of antibiotic sensitivity/ resistance of bacteria to antibiotic discs	4	CM

THEORY (CC-12)
2023-2024
SEM -V (JULY- DECEMBER)

Genetics	CLASS	TEACHER
Unit1: Mendelian Genetics and its Extension 1. Principles of inheritance, Incomplete dominance and co-dominance, Epistasis Multiple alleles, Lethal alleles, Pleiotropy 2. Sex-linked, sex-influenced and sex-limited inheritance, 3. Polygenic Inheritance.	10	TR
Unit2: Linkage, Crossing Over and Chromosomal Mapping 1. Linkage and Crossing Over, molecular basis of crossing over, 2. Measuring Recombination frequency and linkage intensity using three factor crosses, Interference and coincidence	10	AD
Unit3: Mutations 1. Types of gene mutations(Classification), 2. Types of chromosomal aberrations(Classification with one suitable example of each), 3. Non-disjunction and variation in chromosome number; 4. Molecular basis of mutations in relation to UV light and chemical mutagens	8	TR
Unit4: Sex Determination 1. Mechanisms of sex determination in *Drosophila* 2. Sex determination in mammals 3. Dosage compensation in *Drosophila* & Human	8	AD
Unit5: Extra-chromosomal Inheritance 1. Criteria for extra chromosomal inheritance, Antibiotic resistance in *Chlamyadomonas,* 2. Kappa particle in Paramoecium 3. Shell spiralling in snail	4	AD
Unit6: Recombination in Bacteria and Viruses 1. Conjugation, Transformation, Transduction, 2. Complementation test in Bacteriophage	6	TR
Unit7:TransposableGeneticElements 1. Transposons in bacteria, Ac-Ds elements in maize and P elements in *Drosophila,* 2. LINE, SINE, Alu elements in humans	4	AD

PRACTICAL (CC-12)
2023-2024

SEM -V (JULY-DECEMBER)

Genetics	CLASS	TEACHER
Chi-square analyses	6	AD
Problems of linkage maps on *Drosophila*	6	AD
Identification of chromosomal aberration in Drosophila (inversion, ring chromosome, paracentric inversion) from photograph	2	AD
Study of human karyotype, normal and abnormal (Down, Klinefelter, Turner's, Cri-du-Chat) from photograph	4	TR
Pedigree analysis of some human inherited traits (X-linked dominant, X-linked recessive, autosomal dominant, autosomal recessive, Y-linked)	6	TR

THEORY (DSE-1)
2023-2024

SEM -V (JULY- DECEMBER)

Animal Biotechnology	CLASS	TEACHER
Unit1:Introduction 1. Organization of prokaryotic and eukaryotic genome, 2. Concept of genomics	5	SB
Unit2:MolecularTechniquesinGene manipulation 1. Cloning vectors: Plasmids, Cosmids, Phagemids, Lambda Bacteriophage, M13, BAC, YAC, MAC and Expression vectors (characteristics). 2. Restriction enzymes: Nomenclature, detailed study of Type II. 3. Transformation techniques: Calcium chloride method and electroporation. 4. Construction of genomic and cDNA libraries and screening by colony and plaque hybridization 5. Southern, Northern and Western blotting 6. DNA sequencing: Sanger method 7. Polymerase Chain Reaction, DNA Fingerprinting and DNA microarray	23	SB
Unit3:Genetically Modified Organisms 1. Production of cloned and transgenic animals: Nuclear Transplantation, Retroviral Method, DNA microinjection. 2. Applications of transgenic animals: Production of pharmaceuticals, production of donor organs, knockout mice.	12	AD
Unit4:CultureTechniquesand Applications 1. Animal cell culture, 2. Expressing cloned genes in mammalian cells, 3. Molecular diagnosis of genetic diseases(Cystic fibrosis, Sickle cell anaemia)	10	AD

PRACTICAL (DSE-1)
2023-2024

SEM -V (JULY-DECEMBER)

Animal Biotechnology	CLASS	TEACHER
Construction of linear restriction map from the data provided.	4	SB
Calculation of transformation efficiency from the data provided.	6	SB
Study and identification of following techniques through photographs a. Southern Blotting b. Northern Blotting c. Western Blotting d. DNA Sequencing (Sanger's Method) e. PCR f. DNA fingerprinting	10	AD
Project report on animal cell culture	2	SB

THEORY (DSE-2)
2023-2024
SEM -V (JULY- DECEMBER)

Parasitology	CLASS	TEACHER
Unit1: Introduction to Parasitology 1. Brief introduction of Parasitism, Parasite, Parasitoid and Vectors (mechanical and biological vector) 2. Host parasite relationship	2	DM
Unit2: Parasitic Protists Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of *Giardia intestinalis*, *Trypanosoma gambiense*, *Leishmania donovani*	12	DM
Unit3: Parasitic Platyhelminthes Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of *Schistosoma haematobium*, *Taenia sajinata*	12	DRB
Unit4:ParasiticNematodes 1. Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of *Ascaris lumbricoides*, *Ancylostoma duodenale*, *Wuchereria bancrofti* and *Trichinella spiralis*, *Brugiamalayi*; 2. Nematode plant interaction ; Gall formation	12	DRB
Unit5: Parasite Vertebrates Brief account of Cookicutter Shark, Hood Mocking bird, Vampire bat	2	DRB

PRACTICAL (DSE-2)
2023-2024
SEM -V (JULY-DECEMBER)

Parasitology	CLASS	TEACHER
Identification of life stages of *Giardia lamblia* and *Leishmania donovani* through permanent slides/microphotographs	4	DM
Identification of adult and life stages of *Schistosoma haematobium*,*Taeniasolium* through permanent slides/microphotographs	6	DM
Identification of adult and life stages of *Ancylostoma duodenale*, *Wuchereria bancrofti* and *Trichinella spiralis* through permanent slides/microphotographs	4	DM
Identification of plant parasitic root knot nematode, *Meloidogyne* from the soil sample	6	DM
Identification of *Pediculus humanus*, *Xenopsyll acheopis* and *Cimex lectularius* through permanent slides/photographs	4	DRB
Isolation and fixation of nematode/cestode parasites from the intestine of hen[Intestine can be procured from poultry/market as a by-product]	6	DRB
Submission of a project report on any parasite of vertebrates		

THEORY (CC-13)
2023-2024
SEM -VI (JANUARY-JUNE)

Developmental Biology	CLASS	TEACHER
Unit1:Introduction Basicconcepts:PhasesofDevelopment,Cellcellinteraction,Differentiationandgrowth,Differential gene expression	2	DRB
Unit2:Early Embryonic Development 1. Gametogenesis, Spermatogenesis, Oogenesis; 2. Types of eggs, Egg membranes; 3. Fertilization(External and Internal): Changes in gametes, Blocks to polyspermy; 4. Planes and patterns of cleavage; 5. Types of Blastula; Fate maps(including Techniques); 6. Early development of frog and chick up to gastrulation; 7. Embryonic induction and organizers	20	DRB
Unit3:Late Embryonic Development 1. Fate of Germ Layers; 2. Extra-embryonic membranes in birds; 3. Implantation of embryo in humans, 4. Placenta(Structure, types and functions of placenta)	8	DM
Unit4:PostEmbryonicDevelopment 1. Development of brain and Eye in Vertebrate 2. Regeneration: Modes of regeneration, epimorphosis, morphallaxis and compensatory regeneration (with one example each)	12	DM
Unit5:Implications of Developmental Biology 1. Teratogenesis:Teratogenicagentsandtheireffectsonembryonicdevelopment; 2. In vitro fertilization, 3. Stem cell(ESC), 4. Amniocentesis	8	DM

PRACTICAL (CC-13)
2023-2024
SEM -VI (JANUARY-JUNE)

Developmental biology	CLASS	TEACHER
1. Identification of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 to 18 hours), 21-33h, 36-48h and 72-96 hours of incubation (Hamilton and Hamburger stages)	6	CM
Study of the developmental stages and lifecycle of *Drosophila* from stock culture	6	CM
Study and identification of different sections of placenta (through photo micrograph/slides)	4	CM
Project report on *Drosophila* culture/chick embryo development		

THEORY (CC-14)
2023-2024
SEM -VI (JANUARY-JUNE)

Evolutionary biology	CLASS	TEACHER
Unit1 Life's Beginnings: Chemogeny, RNA world, Biogeny, Origin of photosynthesis, Evolution of eukaryotes	5	TR
Unit2 Historical review of Evolutionary concepts, Lamarckism, Darwinism and Neo Darwinism	5	TR
Unit3 1. Geological time scale, 2. Fossil records of Hominids (from *Australopithecus* to *Homo sapiens*), evolution of horse 3. Neutral theory of molecular evolution, Molecular clock	6	TR
Unit4 Sources of variations: Heritable variations and the its role in evolution	5	CM
Unit5 1. Population genetics: Hardy-Weinberg Law (statement and derivation of equation, application of law to biallelic Population); 2. Evolutionary forces upsetting H-W equilibrium; Natural selection (concept of fitness, types of selection, selection coefficient, mode of selection heterozygous superiority). 3. Genetic Drift mechanism (founder's effect, bottleneck phenomenon) Role of Migration and Mutation in changing allele frequencies.	12	CM
Unit6 1. Species concept, 2. Isolating mechanisms, modes of speciation 3. Adaptive radiation/macroevolution (exemplified by Galapagos finches)	6	AD
Unit 7 Extinctions, Back ground and mass extinctions (causes and effects), detailed example of K–T extinction	2	CM
Unit8 Origin and Evolution of Man, Unique Hominin characteristics contrasted with primate characteristic Molecular analysis of human origin	6	AD
Unit9 Phylogenetic trees, Construction & interpretation of Phylogenetic tree using parsimony, Convergent& Divergent evolution.	3	AD

PRACTICAL (CC-14)
2023-2024
SEM -VI (JANUARY-JUNE)

Evolutionary biology	CLASS	TEACHER
Study of fossils from models/pictures	4	TR
2. Study of homology and analogy from suitable specimens	4	AD
3. Study and verification of Hardy-Weinberg Law by chi-square analysis	6	TR
4. Graphical representation and interpretation of data of height /weight of a sample of 100 humans in relation to the age and sex.	6	AD

THEORY (DSE-3)
2023-2024
SEM -VI (JANUARY-JUNE)

Animal Behaviour	CLASS	TEACHER
Unit1:IntroductiontoAnimal Behaviour 1. Origin and history of Ethology, Brief profiles of Karl Von Frish, Ivan Pavlov, Konrad Lorenz, NikoTinbergen 2. Proximate and ultimate causes of behaviour, Methods and recording of a behaviour	5	SB
Unit2:Patterns of Behaviour 1. Stereotyped Behaviours (Orientation, Reflexes); 2. Individual Behavioural patterns; Instinct vs. Learnt Behaviour; 3. Associative learning, classical and operant conditioning, Habituation, Imprinting	6	SB
Unit3: Social and Sexual Behaviour 1. Social Behaviour: Concept of Society; Communication and the senses 2. Altruism; Insects' society with Honeybee as example; Foraging in honeybee and advantages of the waggle dance. 3. Sexual Behaviour: Asymmetry of sex, Sexual dimorphism, Mate choice, Intra-sexual selection (male rivalry), Inter-sexual selection (female choice), Sexual conflict in parental care	15	SB
Unit4:Introductionto Chronobiology 1. Historical developments in chronobiology; 2. Biological oscillation :the concept of Average, amplitude, phase and period 3. Adaptive significance of biological clocks	10	AD
Unit5: Biological Rhythm 1. Types and characteristics of biological rhythms :Short- and Long- term rhythms; Circadian rhythms; Tidal rhythms and Lunar rhythms; 2. Concept of synchronization and masking; Photic and non-photic zeitgebers; Circannual rhythms; 3. Photoperiod and regulation of seasonal reproduction of vertebrates; 4. Role of melatonin.	14	AD

PRACTICAL (CC-DSE-3)
2023-2024
SEM -VI (JANUARY-JUNE)

Animal Behaviour	CLASS	TEACHER
Study of nests and nesting habits of the birds and social inseccts	4	SB
Study of the behavioral responses of woodlice to dry and humid conditions.	5	SB
Study of geotaxis behaviour in earthworm	4	SB
Study of photo taxis behaviour in insect larvae	4	SB
Visit to Forest/Wildlife Sanctuary/Biodiversity Park/Zoological Park to study behavioural activities of animals and prepare a short report.		
Study and actogram construction of locomotor activity of suitable animal models.	6	SB
Study of circadian functions in humans (daily eating, sleep and temperature patterns).	5	SB

THEORY (DSE-4)
2023-2024
SEM -VI (JANUARY-JUNE)

Endocrinology	CLASS	TEACHER
Unit1:Introductionto Endocrinology 1. General idea of Endocrine systems, Classification, Characteristics and Transport of Hormones, 2. Neurosecretions and Neurohormones	4	UKS
Unit2:Epiphysis,Hypothalamo-hypophysial Axis 1. Structure of pineal gland, Secretions and their functions in biological rhythms and reproduction. 2. Structure and functions of hypothalamus and Hypothalamic nuclei, Regulation of neuroendocrine glands, Feedback mechanisms 3. Structure of pituitary gland, Hormones and their functions, Hypothalamo- hypophysial portal system, Disorders of pituitary gland.	16	CM
Unit3:Peripheral Endocrine Glands 1. Structure, Hormones, Functions and Regulation of Thyroid gland, Parathyroid, Adrenal, Pancreas, Ovary and Testis 2. Hormones in homeostasis 3. Disorders of endocrine gland	16	UKS
Unit4:Regulation of Hormone Action 1. Mechanism of action of steroidal, non-steroidal hormones with receptors 2. Bioassays of hormones using RIA &ELISA 3. Estrous cycle in rat and menstrual cycle in human 4. Multifaceted role of Vasopressin &Oxytocin. 5. Hormonal regulation of parturition.	14	UKS

PRACTICAL (CC-DSE-4)
2023-2024
SEM -VI (JANUARY-JUNE)

Endocrinology	CLASS	TEACHER
Dissect and display of Endocrine glands in laboratory bred rat.	6	CM
Study of the permanent slides of all the endocrine glands (Thyroid, Adrenal, Pancreas, Testis and Ovary)	6	CM
Tissue fixation, embedding in paraffin, microtomy and slide preparation of any endocrine gland	8	UKS
Demonstration of hormone assay through ELISA from available teaching kit	4	CM

Suri Vidyasagar College

Zoology PG - 2023-24 (Semester-1)

Paper - MSZO101 (Ecology, Ethology & Conservation Biology) **Full Marks - 40**

Unit-1(Ecology)

Topics	Alloted Teachers	Alloted Classes

Ecosystem
       Structure and function
       Energy flow, Ecological efficiencies
       Cybernatic nature in ecosystem
       Concepts of productivity, Primary productivity and secondary production
	DRB	

Soil as an ecosystem
        Development
        Profile
        Soil aeration and porosity
        Fauna
        Pollution
	DRB	

Habitat and niche
        Concept of habitat and niche
        Niche width and overlap
        Fundamental and realized niche
        Bioinvasion
        Resource partitioning
        Character displacement
	DRB	

Population Ecology
     Characteristics of a population
  Population growth control
  Population regulation
  Life history strategies (r and k selection)
  Concept of metapopulation - demes and dispersal, interdemic extinctions, age structure populations
	DRB	

Community Ecology
     Nature of communities, Community structure and attributes
  Ecological succession
  Level of species diversity and its measurement
  Interspecific interactions (competition, herbivory, carnivory, pollination, symbiosis)
  Edges and ecotones
	AD	

Topics	Alloted Teachers	Alloted Classes

Biogeography
 	
    Major terrestrial biomes
    Geographic origin of species
	AD	

Theories on biogeoraphic distributions
 	
    Theory of island biogeography
    Biogeographical zones of India
	AD	

Environmental pollution Concept of Environment, Composition of Environment, Sources and effects of primary and secondary air pollutants, global warming and green house effects, ozone layer depletion, El Niño and La Niña, water pollution on terrestrial and aquatic animals and control measures for environmental pollution, anti-pollution laws	**AD**	

Unit-2 (Ethology and Conservation Biology)

Topics	Alloted Teachers	Alloted Classes

Ethology
 	
    Introduction to Ethology
    Proximate and ultimate reasoning
    Development of behavior
    Social communication and dominance
    Approaches and methods in study of behavior
    Altruism and evolution-group selection, kin selection, reciprocal altruism
	SB	

Learning
 	
    Neural basis of learning, memory, cognition, sleep and arousal
    Biological clocks: Basic components, functions and regulations
	SB	

Territoriality and foraging behaviour
 	
    Use of space and territoriality
    Mating systems, parental investment and reproductive success
    Parental care
    Aggressive behaviour
    Habitat selection and optimality in foraging
    Migration, orientation and navigation
	SB	

Topics	Alloted Teachers	Alloted Classes
Conservation biology o Introduction to biodiversity concepts, significance, magnitude and distribution o Threats to biodiversity, major causes of extinction, IUCN threat categories, Red Data Book/Red List o Megadiversity zones and Hot spots, concepts, distribution and importance o Centres of origin of cultivated crop plants o Uses of biodiversity, flagship species, keystone species, indicator species, umbrella species, strategies for sustainable exploitation of biodiversity.Basic concept of radio and satellite telemetry in monitoring wild animals o Major approaches to management; Indian case studies on conservation/management strategies (Project Tiger, Project Vulture) o Concept of Biosphere Reserve, National Park and Wildlife Sanctuary;Biosphere Reserves of India	**SB**	

Paper - MSZO12 (Basic and Applied Entomology)

Unit - 1(Entomology I)

Topic	Alloted Teachers	Alloted Classes
Insect diversity and classification Insect diversity and adaptive features Outline of classification of Insects up to the orders with examples (After Richards and Davies, 1977 with minor revision)	**CM**	
Structure and function *External organs* - Cuticle: Structure, formation Mouthparts: Mechanics and regulation of feeding Antenna: Sensory structures Eye: Simple and compound, receptor physiology Legs: Mechanics of locomotion Wing: wing coupling, mechanism of flight, Kinematics	**CM**	
Internal organs - Alimentary canal: Gut structure, metabolic processes Circulatory system: Structure, haemolymph Tracheal system: Components, mechanisms of gaseous exchange Endocrine systems: Organs, types of hormones Excretory system: Mechanisms of urine formation Reproductive system: Male and female internal reproductive organs, sperm transfer, oviposition	**CM**	

Metamorphosis	CM	
Hormonal regulation: Chemistry, sources and mechanism of hormone actions		
Social orgainsation	**CM**	
Termites and honey bees		

Unit-2(Entomology II)

Topic	Alloted Teachers	Alloted Classes
Sound production	**CM**	
Organs and mechanisms		
Bioluminescence	**CM**	
Organs and mechanisms of light production		
Chemical Communication	**CM**	
Pheromones, kairomones, allomones, synomones		

Insect-plants interactions
   Plant structure and chemistry
   Insects and host-plant interactions
	CM	

Insect control and management
   Insecticides, insecticide resistance, biopesticides
   Insect Growth regulators, Sterile Insect technique
   Integrated Pest Management: Concept, Economic Injury Level (EIL), Economic threshold (ET)
   Transgenic plants
	CM	

Paper - MSZO103(Parasitology and Vector Biology)

Unit-1

Topic	Alloted Teachers	Alloted Classes
General idea Symbionts, parasites, vectors and hosts, Ecology of parasitism, Immune response to the Parasites, Parasite genomics, protemics and metabolomics	**AD**	

Topic	Alloted Teachers	Alloted Classes

Host-Parasite interaction
   Host-parasite interactions, Cytoadherence/colonization and Cell-parasite interactions (Blood and intestinal parasites), virulence factors and pathogenicity islands
   Immunological variations in vertebrates and invertebrates and epidemiological surveillance tools and vital statistics
	AD	

Protozoology Classification of parasitic Protozoa	**AD**	
Intestinal Sarcodina and Flagellates General account, morphology, life cycle, pathogenicity and control of *Entamoeba histolytica* and *Giardia lamblia*	**AD**	
Haemoflagellates Morphological stages, life cycle, clinical features and control of *Trypanosoma cruzi* and *Leishmania donovani*	**AD**	
Haemosporina	**AD**	
Zoonosis	**AD**	
Malarial parasites Morphology, life cycle, clinical features, treatment, Prevention and control of Plasmodium vivax, epidemiology, natural and acquired immunity	**AD**	

Unit-2

Topic	Alloted Teachers	Alloted Classes

Helminthology
   Classification of parasitic helminthes
   General characteristics of the Cestoda, Trematoda and Nematoda		

Morphology, life history, pathogenicity and control *Paragonimus westermani, Schistosoma haematobium, Taenia saginata, Trichinella spiralis, Dracunculus medinensis*		
Lymphatic Filarial Parasites Zoonotic lymphatic filariasis		

Vector Biology
   Vertical and horizontal transmissions
   Cyclo-developmental, propagative and cyclo-propagative transmissions
   Biology, importance and control
   Anopheles, sandfly, black fly, tabanid fly, ticks and mites		

Paper – MSZO104(Fisheries and Fish Biology)

Unit-1(Fish Biology)

Topic	Alloted Teachers	Alloted Classes
Classification of fish Principles of classification, extinct fish groups, distinctive characters of major fish orders: Cypriniformes, Siluriformes, Clupeiformes, Ophidiiformes, Perciformes, Synbranchiformes, Mugiliformes	DM	
Structure, development, comparative account and functions Integument, scale, bioluminescent organ, electric organs and electroreception, poison gland, swim bladder, Weberian ossicles, digestive system, excretion and osmoregulatory system	DM	
Sense organs Eye and photoreception, olfactory organ and chemoreception, acoustico-lateralis system (membranous labyrinth and lateral line), special sense organs (Ampullae of Lorenzini, Pit Organs)	DM	
Endocrinology Hypothalamo-hypophyseal system, Pituitary gland (Origin, location, anatomy and functional morphology, hormones), Other endocrine glands (structure and functions): Thyroid, Adrenal, Corpuscles of Stannius, Ultimobranchials, Caudal neurosecretory system and Pineal (Endocrine function of the gonads)	DM	
Reproduction and Development Structure and functions of reproductive organs, gametogenesis, types and modes of reproduction, sexuality (intersex, bisexuality, hermaphroditism); breeding and parental care	DM	
Fish migration Purpose and types of migration in fish, diadromous migration, physiological factors controlling iono and osmoregulation, energetics, environmental, factors, anthropogenic impacts	DM	

Unit-2(Fisheries)

Topic	Alloted Teachers	Alloted Classes

Concepts of fisheries and aquaculture
   Present status, scope and possibilities of further development
   Fisheries resources, Nutritive value of fish
   Different culture systems (extensive, intensive, semi-intensive, fresh water, brackish water, coastal, hill stream, cage, pen, and race way)
	UKS	

Inland fisheries Cultivable fishes, construction of pond, pond soil and water, carrying capacity, pond management for different stages of carp, induced breeding of prawn and air breathing fish, composite culture of carps and air breathing fish, inland fishing gears and fishing method	**UKS**	
Ornamental fish culture and aquarium management Design and construction of aquarium, common ornamental fishes, breeding and seed production (live bearers and egg layers), aquarium plants, maintenance and water quality management	**UKS**	
Aquaculture biotechnology Aquaponics and hydroponics, hybridization and transgenic fish, pearl oyster farming and pearl culture technology, fish oil (composition, extraction and purification)	**UKS**	
Marine fisheries Resources, marine zonation, principal capture fisheries (Hilsa, Sardine, Mackerel, Bombay Duck, and Pomfrets), elasmobranch fishery (major groups, fishery methods, importance), molluscan fishery	**UKS**	

Practical Papers

Paper-MSZO105 (Ecology and Conservation Biology)

Unit-1

Topics	Alloted Teachers
1. Quantitative estimation of major physico-chemical components in an ideal aquatic ecosystem: temperature, pH, dissolved oxygen and carbon di-oxide, chloride, hardness and salinity 2. Quantitative estimation of soil edaphic factors and sediment: moisture, pH, phosphates and nitrates 3. Wildlife census techniques: Line transact method, Pug mark analysis 4. Phototaxic movement of earthworm 5. Effects of different stimulants on coughing rate and operculum movement in fish 6. Laboratory records 7. Viva-voce	DRB

Paper – MSZO105 (Basic and Applied Entomology)

Unit-2

Topics	Alloted Teachers

1. Digestive system of Honey bee
2. Nervous system of Honey bee
3. Mounting and study of:
    Mouthparts of grasshopper, bug, mosquito, house fly, bee
    Wings of Ephemeroptera, Odonata, Dictyoptera, Hemiptera, Diptera, Hymenoptera, and Coleoptera
    Legs: Gressorial, cursorial, saltatorial, fossorial, natatorial, corbiculate, clasporial, and raptorial
    Antennae: Filiform, setaceous, plumose, pilose, pectinate, clavate, geniculate, aristate, serrate, and monilifom
    Abdominal appendages: Male genitalia
4. Identification of common pests: Paddy (*Nilaparvata lugens*, *Nephotettix* spp., *Leptocorisa* spp., *Scirpophaga incertulas*/*innotata*); Jute (*Apion corchori, Diacrisia obliqua*); vegetables (*Epilachna* sp., *Leucinodes orbonalis*); stored grains (*Sitophilus oryzae*, *Callosobruchus* spp., *Tribolium castaneum*)
5. Identification of forensically important insects: *Musca* sp.*, Calliphora* sp., *Sarcophaga* sp., histerid beetle, and staphylinid beetle
6. Social Insects: Morphological studies of social insects (Honey bee and termite)
7. Laboratory records
8. Submission of prepared slides and pests
9. Viva-voce
	CM

Paper – MSZO106 (Parasitology and Vector Biology)

Unit-1

Topics	Alloted Teachers
1. Smear preparation and staining of parasitic Protozoa 2. Drawing and staining of blood films for parasitic Protozoa and microfilaria 3. Whole mount preparation of trematode and arthropod parasites 4. Staining of scolex and proglottids of cestodes 5. Whole mount preparation of mosquito vectors (*Anopheles, Culex* and *Aedes*) 6. Identification of parasites and vectors (Slides/ Photographs) 7. Retrieval of parasite nucleic acid /protein sequence from Nucleic acid/ Protein Data Base / Parasite Data-Base, Alignment of parasite DNA /Protein sequence 8. Laboratory records 9. Submission of prepared slides 10. Viva-voce	AA

Paper – MSZO106 (Fish Biology and Fisheries)

Unit-2

Topics	Alloted Teachers
1. Study of bucco-pharynx, gill rakers and gut content analysis in relation to food habits of teleosts 2. Urinogenital, olfactory and digestive systems in teleosts 3. Gas (swim or air) bladder and Weberian ossicles 4. Histological preparation of testis, ovary, kidney, pituitary, hepato-pancreas and intestine of fish 5. Identification of different fish 6. Laboratory records 7. Submission of prepared slides 8. Viva-voce	UKS

Zoology PG (2ⁿᵈ Semester)

Paper-MSZO201 (Biosystematics and Evolutionary Biology)

Unit-1(Biosystematics)

Topic	Alloted Teachers	Alloted Classes
Taxonomic characters Concept of character, qualitative and quantitative, homology	**AD**	
Species concepts Biological, Evolutionary; Phylogenetic	**AD**	
Species taxon Polytypic, categories, intra-populational variations, delimitation criteria	**AD**	

Classification
    Phenetics: Concept, phenograms
    Cladistics: Concept, homology, homoplasy, cladograms
    Evolutionary: Concept of monophyly, paraphyly & polyphyly
	AD	

Molecular taxonomy
    Genomics and Proteomics in taxonomy: Concept and applications
    Molecular basis of taxonomy: nuclear DNA, mitochondrial DNA, ribosomal RNA, cytochrome-C, α globin polypeptide chain
    Sequence alignment: Pair-wise alignment and multiple sequence alignment, Global and local alignment
    Nuclear substitution models
    DNA barcoding, Barcode gap, Barcode databases
	AD	

International Code of Zoological nomenclature (ICZN) The International Code; interpretations and applications	**AD**	
International Code of phylogenetic nomenclature (PhyloCode) Principles; important rules and their interpretations	**AD**	

Unit-2 (Evolutionary Biology)

Topic	Alloted Teachers	Alloted Classes
Evolutionary time scale and geological eras	**DRB**	
Origin and early history of life Evolution of prokaryotes; Origin and evolution of unicellular eukaryotes - Endosymbiotic theory	**DRB**	

Topic	Alloted Teachers	Alloted Classes

Population as unit of evolution
 	
    Populations, gene pool, gene frequency in Mendelian population
    Hardy-Weinberg Equilibrium
    Major evolutionary forces: Migration; Mutation; Selection (types of selection, selection coefficient, selection in natural populations); Random genetic drift
	DRB	

Species and phylogenetic relationships
 	
    Concepts of species and models of speciation
    Phylogenetic relationships; Chromosome phylogeny in Drosophila (based on inversion polymorphism)
	DRB	

Chromosomal, allozyme and DNA polymorphisms
 	
    Adaptive genetic polymorphism
    Balanced polymorphism and heterosis
    Genetic coadaptation and linkage disequilibrium
	DRB	

Evolution at molecular level
 	
    Genomic and proteomic changes
    Concepts of neutral evolution and Molecular clock
    Molecular phylogeny
	DRB	

Hominid evolution
 	
    Anatomical, geographical and cultural
    Ancestry of Homo sapiens: molecular phylogenetic relationship
    Peopling of continents
    Human genome variation
    Ancient DNA
	DRB	

Patterns and trends in evolution
 	
    Constructing evolutionary trees, measures of genetic relationship among organisms
    Tools of studying human evolution
    Cultural evolution
	DRB	

Paper-MSZO202 (Microbiology and Immunology)

Unit-1(Microbiology)

Topic	Alloted Teachers	Alloted Classes
Pioneers of Microbiology Contributions of Leeuwenhoek, Koch, Pasteur, Jenner and Flemming	**SB**	
Microbial Ecology Microbial habitat (air, water and soil), Interactions among microbial populations, Microbial community dynamics (Population selection, Succession within microbial communities, Microbial Diversity and stability), Abiotic limitations of microbial growth (Liebig`s Law of Minimum, Shelford`s Law of Tolerance)	**SB**	

Topic	Alloted Teachers	Alloted Classes
Bacteriology Major characteristics used in bacterial taxonomy, Structure and function of capsule, pili, flagella, cell wall, cell membrane, outer-membrane, plasmid and bacterial chromosome, Bacterial endospore, Control of microbes: Physical and chemical agents, chemotherapeutic agents (sulfa drugs and antibiotics)	**SB**	
Virology Structural organization of viruses, Prions and viroids, Lytic cycle of bacteriophages with reference to E. coli and T4, Lysogeny, lysogenic conversion, induction and significance	**SB**	
Animal and Veterinary Microbiology Microbial interactions with animals (Marine and freshwater invertebrates, Ruminants), Symbiotic light production, Sulfide based mutualism, Infections of Escherichia coli, Shigella dysenteriae, Streptococcus pyogenes and Staphylococcus aureus, Microbial diseases of Cattles and Poultry birds	**SB**	
Insect Microbiology and Insect pathology Insect-pathogen relationship, Factors affecting the pathogenicity of insects, General properties, types and properties of toxins and mode of action of Bacillus thuringiensis, Bacillus sphaericus; Bacterial and viral diseases of silkworm larvae and honey bees; Endosymbionts and their significance	**SB**	
Medical Microbiology Mode of transmission, pathogenicity and prevention of microbial diseases: Air-borne (Tuberculosis and Influenza), Food and waterborne (Typhoid andCholera) and Arthropod borne (Dengue, JE and Yellow fever), Coronavirus disease (COVID-19) and herd immunity	**SB**	

Unit-2 (Immunology)

Topic	Alloted Teachers	Alloted Classes

Overview of Immune System
 	
   Innate and Adaptive Immunity
   Specificity, diversity, Self vs. non-self discrimination, Antigen and Antibody, Memory Cells and Tissues of the Immune system, Anatomy and Functions of lymphoid tissues, antigens and antibodies, MHC molecules, Cytokines, complement system
	DM	

Innate Immunity
 	
   Nature and types of Pathogens associated molecular patterns - PAMP and DAMP, Recognition, cell associated pattern recognition receptor- Toll like Receptors (TLRs) structure and signalling, & sensors, cellular components, soluble effectors molecules
   Inflammation reaction - Inflammasome
	DM	

Adaptive immunity
   Interaction between innate and adaptive immunity
   Antigen Presentation and association with major histocompatibility complex (MHC), polymorphism of MHC genes
   Antigens: B cells and T cell antigens, different types of epitopes, T cell epitope and T cell receptors
   Immunoglobulins: Isotypic, allotypic and idiotypic variations
   Generation of antibody diversity; Clonal selection theory, concept of antigen specific receptor
   Organization and expression of immunoglobulin genes: generation of antibody diversity
   Activation of T-Lymphocytes, MHC restriction
	DM	

Hyperactivation of Immune System Allergens and Hypersensitivity, Allergy, aetiology of Asthma, Genetics of hypersensitivity, Cytokine storms	**DM**	
Immunologic Tolerance and Autoimmunity Autoimmune disorders – Rheumatoid arthritis, Systemic lupus erythematosus, Inflammatory bowel disease	**DM**	
Immunity to Tumors Tumour microenvironment and immune cells- TAM, T reg cells and others, Immune check point inhibitors	**DM**	
Transplantation Immunology Different types grafting, Graft rejection, Graft versus host disease (GvHD),Genetics of HLA typing and disease association	**DM**	

Immunotechnology
   Vaccine – different types of vaccine, strategies of vaccine development - subunit vaccine, mRNA vaccine and others
   Hybridoma technology
   Antibody engineering
   Immunoassays- Types and applications
   Immunophenotyping
	DM	

Paper-MSZO203 (Genetics And Cell Biology)

Unit-1 (Genetics)

Topic	Alloted Teachers	Alloted Classes
Overview of Mendelian genetics and its extension and inheritance biology	**UKS**	
Variations and Mutations Allelic frequencies, Genetic polymorphism-SNPS, factors responsible for stable polymorphism; DNA markers and populations differences; Genetic markers-STS, VNTRs, RFLP, AFLP	**UKS**	
Cytogenetics Karyotyping; banded chromosomes and individual characterization of the human chromosomes; numerical chromosomal abnormalities; structural chromosomal abnormalities; somatic cell hybridization and use of somatic cell	**UKS**	

Topic	Alloted Teachers	Alloted Classes
Human genome project Human genome project and characteristics of human genome as eukaryotic genomic organization, Objectives and organization of human genome project, mapping strategies; Diversity and organization of human genome	**UKS**	
Model organisms Genetics of Drosophila, Zebra Fish, Sex determination of Drosophila and man	**UKS**	
Mitochondrial genome Mitochondrial genome organization and disorder associated with mitochondrial DNA	**UKS**	
Epigenetic modifications and disorders	**UKS**	
Genetic disorders and Twin Study and Gene therapy Monogenic diseases – Thalassemia, Albinism, Hemophilia, Colour blindness, Polygenic diseases- Hyperlipidemia, Diabetes mellitus Genetic basis of Myocardial Infarction, Genetic basis of neurodegenerative disorders	**UKS**	
Cancer Biology and Genomics Types, driver and passenger mutation;somatic mutations, genomic instability, cancer therapy	**UKS**	
Techniques in Genomic study Gel Electrophoresis, PCR, ARMS PCR, MLPA, RT-PCR, Sanger sequencing, NGS, genome-wide association studies (GWAS) and personalized medicine and pharmacogenomics	**UKS**	
Genetic screening and counselling Prenatal and Post-natal screening of genetic diseases, amniocentesis, chronic villus sampling, family screening for genetic diseases; scope and methods of genetic counselling	**UKS**	
Databases and societies for Genomic study dbSNP, hGVS, OMIM, HUGO and HGVS	**UKS**	

Unit-2 (Cellular Process, Omics Study and Application)

Topic	Alloted Teachers	Alloted Classes

Overview of cellular structure and division
 	
    Cytoskeleton and cellular transport: Structure and function of microtubules, dynamic instability, MAPs, molecular motors
    Cell signalling: Cell surface and intracellular receptors, ligands, cell signaling pathways (MAPK, TGFB, NfKB) and cross talk mechanisms; Role of calcium and NO in signal transduction
    Cytotoxicity: Carcinogens, mutagens, teratogens
    Apoptosis:Molecular mechanisms, regulations
    Autophagy, cellular senescence, Chaperones
    Exosome biogenesis and function and molecular cargo
	TR	

Topic	Alloted Teachers	Alloted Classes
Study of Transcriptomics Gene regulation, non-Coding RNAs: sncRNA miRNA, LncRNA	**TR**	
Study of Metabolomics: Metabolome and Metabolic disorders	**TR**	
Methods in Cellular Process study and application Two hybrid screening, Co-Immunoprecipitation study, Western blotting, Nucleic Acid Hybridization Assays, Gel retardation assay, Cloning of Gene and generation of Recombinant DNA, Preparation and screening of genomic and cDNA library, somatic cloning, Gene knockout procedure, Cre-Lox P, CRISPER-CAS system and generation of transgenic animal, Ethics and rule	**TR**	
Techniques in cellular process Primary culture and cell lines, organoid culture, MTT assay, cancer lines, Cell freezing, Confocal and Atomic force microscopy, Flow cytometry, Micro-array, National and global Cell repositories – ATCC, NCCS	**TR**	
Cell synchronization, Fluorescence plus Giemsa staining technique, average generation time	**TR**	
Databases for cellular process study: Geo databases, Pathway analysis and databases, miRBase	**TR**	

Paper-MSZO204 (Physiology and Endocrinology)

Unit-1 (Physiology)

Topic	Alloted Teachers	Alloted Classes
Basic concepts Homeostasis, acclimatization and adaptation	**CM**	
Circulation Composition of blood and its corpuscular elements: ultrastructure, pigments, and their formation Hemostasis: platelet activation cascades, regulation Lymph: composition and dynamics Cardiac cycle and basic principle of ECG	**CM**	
Respiration General idea: Total and partial air pressure Gas solubility and diffusion in air and water In Aquatic animals: Gill architecture in fish; ram ventilation, dual pump, gas exchange (counter current mechanism) In Terrestrial animals: Lung ventilation (amphibians, reptiles, birds and mammals) Lung mechanics (human): Respiratory muscles, lung volumes, elastic properties, compliance, surface tension, pulmonary surfactants Regulation (human): Respiratory centers, receptors, integration	**CM**	

Topic		

Excretion and Osmoregulation
 	
  In terrestrial vertebrate (mammals): Structure and functions of kidney, Urea cycle and Aquaporins
  Ultrastructure of nephron
  Urine formation – Glomerular filtration and tubular reabsorbtion,
  In aquatic vertebrate (fish): Importance of kidney as osmoregulatory organ
  External osmoregulatory organs: Salt glands, Fish gills
  Water and electrolyte balance (Na+, K+, Mg2+), Acid-base regulation
	CM	

Thermoregulation
 	
  Endothermy and Ectothermy
  Thermoregulatory organs, responses to high and low temperature
  Thermogenesis, Characteristics of fever
  Neural Control
	CM	

Sensory
 	
  Neuron: types; synapse (excitatory and inhibitory post-synaptic potential)
  Genesis of membrane potential
  Neurotransmitters (Acetylcholine, GABA, nitric oxide), chemical transmission through synapse
	CM	

Unit-2 (Endocrinology)

Topic	Alloted Teachers	Alloted Classes

Hormones Characteristics and chemical classification of hormones, concept of receptors
 	
  Neuro-endocrine components in vertebrates
  Hypothalamic and Pituitary hormones in vertebrates: Chemical nature and regulations		

Thyroid hormones: biosynthesis and functions		
Pancreatic hormones Structure and biosynthesis and function: insulin and glucagon		

Adrenal hormones
 	
  Structure, biosynthesis and functions of adreno-cortical hormones
  Structure, biosynthesis and functions of adreno-medullary hormones		

Reproductive hormones
 	
  Ovarian and testicular hormones and their functions
  Biosynthetic pathway of ovarian and testicular steroidogenesis
  Hormonal regulation of oestrous and menstrual cycle, and pregnancy		

Hormones of the GI tract		
Structure, functions and regulation of gastrin, rennin, secretin, cholecystokinin and grehlin		
Endocrine disorders		
Diabetes, adrenocortico-disorders, hypo- and hyper-thyroidism, thryrotoxicosis and Infertility		

Practical Papers

Paper-MSZO105 (Biosystematics & Genetics and Cell Biology)

Unit-1(Biosystematics)

Topics	Alloted Teachers

1.
  a. Identification of specimens of major orders of class Insecta using the key
  b. Construction of dichotomous key from the provided dataset
  c. Construction of trees from the provided morphological dataset using suitable software (Mesquite, TnT) and their interpretation
  d. Retrieval of nucleotide sequences from data bases, sequence alignment
  e. Construction of trees from the molecular data using suitable software (MEGA) and their interpretation
2. Laboratory records
3. Viva-voce
	SB

Unit-2(Genetics and Cell Biology)

Topics	Alloted Teachers
1. Separation of peripheral lymphocyte and lymphocyte culture G Banding 2. Study of the Mitotic index and mitotic abnormalities in *Allium cepa* root apical meristem cells 3. MTT test, Trypan blue and Apoptosis test 4. Identification of mutants of *Drosophila* 5. Study of polytene chromosomes of Chironomid larvae 6. DNA extraction and study of the DNA quality and quantity (UV spectroscopy and agarose gel electrophoresis) 7. PCR 8. Demonstration of RT PCR and calculation of Fold change of gene expression (delta CT method) 9. Demonstration of SDS PAGE and determination of the molecular weight of the protein 10. Demonstration of cancer cell culture and counting of colony 11. Demonstration of scratch wound assay – for invasion and metastasis 12. Demonstration of Flow cytometry-based apoptosis and cell cycle analysis 13. Identification of cancer cells and stages 14. Laboratory records 15. Viva-voce	**TR**

Paper-MSZO206 (Physiology and Endocrinology & Microbiology and Immunology)

Unit-1 (Physiology and Endocrinology)

Topics	Alloted Teachers
1. Determination of haemoglobin percent, C.T. and B.T. in human blood 2. Estimation of fasting and PP blood Sugar in human by GOD-POD method 3. Biochemical estimation of blood Cholesterol 4. Preparation of blood film and identification of abnormal RBC (inclusion body), TC -DC 5. Measurement of pulse rate and blood pressure in human 6. Estimation of steroid and thyroid hormone by ELISA 7. Demonstration of ovariectomy, orchidectomy and their effects in laboratory animals 8. Quantitative estimation of ascorbic acid content of ovary as an assay of LH 9. Demonstration of Adrenalectomy in rat 10. Identification of stages of oestrous cycle by vaginal smear preparation in rat 11. Laboratory records 12. Viva-voce	**DRB and CM**

Unit-2 (Microbiology and Immunology)

1.Microbiology Practical

Topics	Alloted Teachers
a. Preparation of liquid media (broth) and solid media for routine cultivation of bacteria b. Preparation of slant and stab c. Pure culture techniques: Spread plate, pour plate and streak plate d. Study on the colony morphology e. Simple staining of bacteria and study of cell types; differential staining: Gram staining f. Biochemical tests for characterization: Catalase, nitrate reduction, indole production, methyl red and Voges–Proskauer test g. Preparation of sanitizer h. Laboratory records i. Viva-voce	**Microbiology Department**

2.Immunology Practical

Topics	Alloted Teachers
a. Identification and demonstration of Primary and secondary lymphoid organ and Preparation of cell suspension from the lymphoid tissue (primary/secondary) of mouse for the estimation of live and dead cells b. Separation of macrophages from the peritoneal exudates and Characterization of nonspecific esterase activity in macrophages c. Separation PBMC from Human blood d. Determination of antibody titer by immunodiffusion methods e. Agglutination and precipitation techniques f. Demonstration of ELISA methods g. Identification of different immune cells and section of immune organs h. Laboratory records i. Viva-voce	**DM**

Zoology PG (3rd Semester)

Paper – MSZO301 (Biochemistry and Toxicology)

Unit-1(Biochemistry)

Topic	Alloted Teachers	Alloted Classes
Laws of thermodynamics and their applications Concept of free energy and calculations based on free energy change	**TR**	
pH and Buffers Bronsted-Lowry concept of acids and bases, buffers, biological buffer systems: the phosphate buffer system, the bicarbonate buffer system	**TR**	
Carbohydrates Overview of classification and importance, asymmetry, optical isomerism, mutarotation	**TR**	

Protein structure
1.Primary structure, peptide bond
2.Secondary structure
   α-helix, β-pleated sheet and bends
   Prediction of secondary structure, Ramachandran plot
3.Tertiary structure
   Forces stabilizing tertiary structure
   Domains and motifs
4.Quaternary structure
	TR	

Lipids Lipid digestion, absorption and transport, Ketone bodies Biological roles of lipids, Emulsification, Surface Tension, Hydrolysis, Saponification, Rancidity, Hydrogenation	**TR**	

Enzymes
Enzyme kinetics
   Thermodynamics of enzyme-substrate interactions, Binding energy in catalysis; Fundamental principles of reaction Kinetics and equilibria of activation energy, Overview of Michaelis-Menten equation, related calculations and Lineweaver-Burk plots
Mechanisms of enzyme action
   Active site, substrate binding, transition state analogues and abzyme
   Acid-base and covalent catalysis (chymotrypsin, carboxypeptidase)
Concepts of regulation of enzyme activity, Multisubstrate systems and their kinetics, Multienzyme complexes
	TR	

Topic	Alloted Teachers	Alloted Classes
Metabolism Glycogen breakdown, glycogen synthesis, regulation of glycogen metabolism, Glycolysis-an overview; Krebs cycle and its regulation; Cori cycle, glyoxylate cycle; glucuronic acid cycle; gluconeogenesis and its regulation; pentose phosphate pathway, regulation and significance, Concept of Integration of metabolic pathways	**TR**	
Energy transduction and ATP synthesis Glucose and fatty-acids as energy source, electron transport chain, oxidative phosphorylation	**TR**	
Metabolic disorders Regulation of amino acid and lipid metabolism and metabolic disorders	**TR**	
Oxidative stress and lipid peroxidation Free radicals and Free radical scavengers (Polyphenols, vitamins C & E, glutathione, catalase, superoxide dismutase); lipid peroxidation	**TR**	
Analytical Biochemistry Differential centrifugation, ultracentrifugation, chromatography, electrophoresis, spectrophotometry, application of spectroscopic techniques to study biomolecular interaction, UV-Vis spectroscopy, fluorescence spectroscopy, IR, GC-MS, protein separation and characterization, X-ray crystallography, NMR, enzyme assays, isolation, purification and criteria for determining purity of enzymes	**TR**	

Unit-2 (Toxicology)

Topic	Alloted Teachers	Alloted Classes
Concept of toxicology	**DM**	

Fundamentals of toxicology
  Types of toxic substances (including natural toxins, concept of xenobiotics, mutagens,clastogens, teratogens, carcinogens)
  Disposition and biotransformation (phase I and phase II reactions)
  Drugs as toxic substance (Paracetamol, Aspirin, Thalidomide)
	DM	

Effects of toxic substances
  Biochemical and physiological effects
  Interactive effects: additive effects, potentiation and synergism
	DM	

Toxicity tests
  Dose, dosage, dose response
  Acute toxicity tests: Bioassay, LC50 and LD50, Probit analysis and significance
  Chronic toxicity tests: Methods and significance; Mutagenicity testing (Ames test)
	DM	

Topic	Alloted Teachers	Alloted Classes

Pesticides
   Concept and classification
   Insecticides and herbicides: Types (including bioinsecticides), sources, effects and degradation kinetics
   Mechanism of action: Organochlorine, Organophosphate, Carbamates, Paraquat, Phenoxy herbicides
	DM	

Metal toxicity Source, exposure, disposition and effects of heavy metals (Cd, Hg, Pb) and lighter elements (As, Se), Metal chelation	**DM**	

Applied toxicology
   Environmental toxicology
   Occupational and industrial toxicology
   Clinical toxicology
   Forensic toxicology
	DM	

Paper - MSZO302 (Histology, Histochemistry and Comparative Anatomy)
Unit-1 (Histology-Histochemistry)

Topic	Alloted Teachers	Alloted Classes
Fixation and Tissue preparation for histology Purpose of tissue fixation, Types of fixation Mechanism of tissue Fixation Fresh-frozen sections; Decalcification	**DB+UKS**	
Embedding Gum-sucrose/gelatin and paraffin wax embedding	**DB+UKS**	
Microtomy Methods. problems and remedies of microtomy including cryostat freezing microtome	**DB+UKS**	
Biological dyes and stains Characteris features of biological dyes and stain; Properties, source and use of haematoxylin, eosin, basic fuchsin, acid fuchsin, and carmine techniques for staining of bacteria, fungi and Protozoa	**DB+UKS**	

Principles and methods of histochemical localization and identification of the following:
Carbohydrate moieties
  Glycogen and glycoproteins with oxidizable vicinal diols by Periodic acid Schiff method
  Glycoproteins with carboxyl groups and/or O-sulphate esters by Alcian blue methods
Protein end groups
  General proteins by Bromophenol blue method
  –NH2 groups by Nihydrin-Schiff method
  –SS groups by Performic acid –Schiff and performic acid – alcian blue methods
	DB+UKS	

Topic	Alloted Teachers	Alloted Classes
Lipid moieties General lipids by Sudan black B method Neutral lipids by total Sudan III and Sudan IV methods **Nucleic acids** Methyl green pyronin for DNA and RNA Feulgen reaction for DNA **Enzymes** Acid and alkaline phosphatases by Metal precipitation and Azo dye methods	**DB+UKS**	
Immunohistochemistry Basic principle, essential requirements, types and applications	**DB+UKS**	
Fluorescence histochemistry Basic principles and applications	**DB+UKS**	
Preparation of biological material for TEM and SEM Applications of electron microscopy in histochemistry, immunocytochemistry and autoradiography	**DB+UKS**	

Unit-2 (Comparative Anatomy)

Topic	Alloted Teachers	Alloted Classes
Comparative study of invertebrates Digestive system Nervous system Excretory system Reproductive system and larval forms	**DB**	
Comparative study of vertebrates Stomach and Intestine Respiratory organs Heart Brain and sensory organs	**DB**	
Comparative modifications in vertebrates Aquatic Terrestrial Aerial Arboreal Fossorial	**DB**	
Development and comparative account in vertebrates The integument and its derivatives (except glands)	**DB**	

Practical Paper

Paper-MSZO303 (Biochemistry and Toxicology)

Unit-1

Topic	Alloted Teachers

1. Studies on quantitation of proteins by various methods: Lowry, Bradford, and UV spectrophotometry
2. Quantitation of Nucleic acids (DNA/RNA)
3. Preparation of extract for enzyme assay and Study of the enzyme (LDH/Alkaline phosphatase, catalase, amylase) activity
4. Electrophoretic analysis of total Protein in tissue extracts
5. TLC for separation of steroid and other secondary metabolites
6. DPPH and FRAP assay
7. Lipid Peroxidation Assay
8. Estimation of Lipid profile from blood
9. Determination of LC50 and LD50, Probit analysis
10. Evaluation of toxicity through assay of
  (a) Cytochrome P-450 and
  (b) Acetylcholinesterase
  (c) Catalase
11. Assessment of toxicity through behavioural studies
  (a) Crawling activity
  (b) Climbing activity
12. Morphological deformities (study of symmetry) in biological organisms
13. due to toxicant exposure
14. Laboratory records
15. Viva-voce
	TR & AD

Paper – MSZO303 (Histology-Histochemistry and Comparative Anatomy)

Unit-2

Histology-Histochemistry

Topic	Alloted Teachers
1. Fixation, dehydration, embedding, section cutting, staining and mounting of different animal tissues (Haematoxylin and Eosin, Mallory's Triple) 2. Identification of histological preparations of animal tissues 3. Demonstration of different microscopes 4. Histochemical reactions for: Carbohydrates, protein, lipid, DNA/RNA and alkaline phosphatases 5. Submission of permanent slides prepared for histological and histochemical studies of different tissues 6. Laboratory records 7. Viva-voce	DM

Comparative Anatomy

Topic	Alloted Teachers
1. Study of Anatomy a. Afferent branchial system of *Channa* sp. b. Ninth (IX) and tenth (X) cranial nervous system of *Channa* sp. c. Digestive and nervous system of *Vespa* sp. d. Nervous system of prawn 2. Laboratory records 3. Viva-voce	DM

Paper - MSZO304 (General Elective : Applied Zoology)

1. Aquaculture management
2. Diabetes: Causes and management
3. Ecology and Ethology
4. Human genetics and Diseases
5. Immunodiagnostics
6. Insect Diversity; social insects
7. Medical Entomology
8. Microbial diseases and community health
9. Mosquito and Mosquito borne diseases
10. Nanomedicine: Nanotechnology, Biology and Medicine
11. Toxicology in everyday life

Paper - MSZO305 (Discipline Centric Elective Subject)

DE-5 (Parasitology and Microbiology)

Topics	Alloted Teachers	Alloted Classes
Bacterial Nutrition Nutrition and nutritional types of bacteria; types of culture media: natural, synthetic, semi-synthetic and selective media; composition and principles of : nutrient agar, MacConkey Agar, triple-sugar-iron agar, Pseudomonasisolation agar, blood agar, XLD agar, Mannitol salt agar	**AD+SB**	
Bacterial Growth Phases of growth, kinetics of growth, generation time, batch culture, continuous culture and synchronous culture, Chemostat and Turbidostat, pure culture techniques, preservation of bacteria, environmental factors influencing growth (temperature, pH, salt concentration, oxygen, osmotic concentration)	**AD+SB**	
Systemic Microbiology Classification, phenotypic, biochemical and toxin features, pathogenesis and laboratory diagnosis of : Staphylococcus, Streptococcus, Escherichia coli, Klebsiella and Proteus, Pseudomonas	**AD+SB**	
Genome organization and mode of replication of animal and human infecting viruses Rabies virus, Poliovirus, Coronaviruses, Dengue virus, Poxvirus and HIV	**AD+SB**	

Immunopathogenesis of Malaria Host cell-parasite interactions; Factors affecting natural immunity in host's body against malaria (Glucose 6 phosphate dehydrogenase deficiency, Sickle cell trait, HBE, Duffy negativity, ovalocytosis); Role of immune cells; Adaptive immunity	**AD+SB**	
Mode of transmission, pathogenicity and prevention of bacterial diseases: Anthrax, Tetanus, Diphtheria and Botulism	**AD+SB**	
Mode of transmission, pathogenicity and prevention of viral diseases Corona Virus diseases (COVID-19), Common cold, Herpes simplex virus, Mumps, Measles and Rabies	**AD+SB**	
Molecular parasitology and Microbiology Basic techniques for molecular analysis of parasitic and microbial systems: Isolation of DNA and RNA from bacteria, protozoan and helminth parasites, Hybridization, ELISA, DNA sequencing, Blotting techniques, Amplification of DNA by Polymerase Chain Reaction, DNA probes in diagnosis and epidemiology of Leishmaniasis, Malaria, Lymphatic filariasis	**AD+SB**	

Paper – MSZO306 [DE-6] (Parasitology and Microbiology)

Topics	Alloted Teachers

1. Determination of bacterial load of water /soil /food samples by standard plate count method
2. Determination of potability of water (presumptive test)
3. Microbiological examination of curd sample
4. Enrichment culture of spore formers
5. Microbiological examination of milk (Methylene blue reductase test)
6. Antibiotic sensitivity test
7. Study on physiological and bio-chemical characteristics: starch hydrolysis, gelatin hydrolysis, fat hydrolysis, tryptophan hydrolysis, urea hydrolysis, citrate utilization
8. Cell culture techniques, transfection and infection of cells
9. Isolation of plasmid DNA from bacteria & Agarose gel Electrophoretic separation of DNA
10. Field -Visit
   a. Methods of bacteria isolation and preservation
   b. Study of bacterial diversity of soil/water samples of a rice-field/forest/river/sea
11. Laboratory records
12. Viva-voce
	Microbiology Department

Paper – MSZO307 (Community Engagement)

COMMUNITY OUTREACH: (*Students will undertake any community service based on their Major Elective*)

Zoology PG(4th Semester)

Paper - MSZO401 (Developmental Biology and Stem Cell Biology)

Unit-1 (Developmental Biology)

Topics	Alloted Teachers	Alloted Classes

Overview Determination, specification
  Genomic equivalence, potency, Induction, competence
  Lateral inhibition, morphogen gradients, morphogenetic field
	DM+DB	

Molecular components Transcription factors, signaling systems, inducing factor families, Cytoskeleton, cell adhesion molecules, ECM	**DM+DB**	

Techniques and experimental embryology
  Cell labelling; genetic techniques
  Model organisms - Dictyostelium, C. elegans, Drosophila
  Embryonic stem cells and applications
	DM+DB	

Pattern Formation **Drosophila** : Pattern formation: dorsal-ventral, anterior-posterior segmentation genes, homeotic genes *C. elegans* : Programmed cell death, vulva development **Vertebrates** : Development and patterning of vertebrate limb, homeobox genes in patterning	**DM+DB**	

Organogenesis
Nervous system
  Neurogenesis, gliogenesis, neural crest cells
Mesodermal organs
  Somitogenesis, myogenesis, germ cell determination and migration
Endodermal organs
  Gut – cytodifferentiation
Environmental regulations
  Phenotypic plasticity, polyphenism, Epigenetic regulation of development
Evo-Devo concepts
  Heterochrony, Heterotopy, Heterometry, Heterotypy
	DM+DB	

Evolution of complexity	**DM+DB**	

Unit-2 (Stem Cell Biology)

Topics	Alloted Teachers	Alloted Classes

Introduction to Development
    Early Development : Fertilization, Totipotency and pluripotency
    Gastruation and lineage commitment in the early embryo
	UKS+CM	

Introduction To Stem Cell Biology Definition, Types, The Embryonic Stem Cell : The Human Embryonic Stem Cell And The Human Embryonic Germ Cell, The Adult Stem Cell	UKS+CM	

Pluripotency and Reprogramming in vitro
    Establishment of embryonic stem cells (ESCs)
    Characterization of pluripotent stem cells (PSCs)
    Molecular mechanisms underlying pluripotency
    Induction of pluripotency
	UKS+CM	

Adult Stem Cells and Regeneration
    Tissue regenerative capacity
    Regeneration in hydra, zebrafish, axolotl, and mammals
    Facultative stem cells
   Trans differentiation
    De-Differentiation and plasticity
	UKS+CM	

Leveraging Tools to Study Stem Cell Biology
    Editing the stem cell genome
    In vivo tools in stem cell biology
    Computational tools to dissect stem cell heterogeneity
    In vitro cultures of adult stem cells to analyze the differentiation capacity
	UKS+CM	

Clinical Applications of Stem Cell Biology
    Autoimmune Diseases and the Promise of Stem Cell-Based Therapies
    Stem Cells and Diabetes
    Rebuilding the Nervous System with Stem Cells
    Can Stem Cells Repair a Damaged Heart?
	UKS+CM	

Use of Genetically Modified Stem Cells in Experimental Gene Therapies	UKS+CM	
Ethical Issues in Stem Cell Research	UKS+CM	

Paper - MSZO402 (Biostatistics and Computational Biology)

Biostatistics

Topics	Alloted Teachers	Alloted Classes
Sampling, data and central tendency Data types, Sampling, Frequency distribution, Quartile and percentile, Parameters and Statistics, Mean, Median, Mode, different types of distribution, Standard deviation and error, Coefficient of variation, Skewness and Kurtosis	**TR+AD**	
Sampling, data and central tendency Data types, Sampling, Frequency distribution, Quartile and percentile, Parameters and Statistics, Mean, Median, Mode, different types of distribution, Standard deviation and error, Coefficient of variation, Skewness and Kurtosis	**TR+AD**	
Linear regression Regression vs. Correlation, Correlation coefficient, Simple linear regression equation, Testing the significance of relation (r^2)	**TR+AD**	

Testing for goodness of fit
    Chi-Square goodness of fit, Heterogeneity Chi-Square, Odds ratio
    Chi-Square analysis of contingency table
	TR+AD	

Multiple comparisons Tukey test, Bonferroni and Benjamini Hochberg test, Concept of multivariate analysis	**TR+AD**	
Survival analysis Concept of life tables, censored data, Estimation of survival function, Kaplan – Meier analysis	**TR+AD**	

Concept Of Computational Operation

Topics	Alloted Teachers	Alloted Classes
Basics of computers CPU, input and output devices, operating systems (Windows, LINUX/UNIX), GUI, flowchart and programming concept, server and grid computation; Computer networks and internet, search engine, Boolean Operators	**TR+AD**	
Bioinformatics Concept and types of Databases, Nucleic acid sequences databases, SNP database, Genome database, Protein databases, structures and interacting proteins databases, Protein motifs, folds and domains databases, Sequence alignments (BLAST and Clustal W) Concept of health-informatics and nutrigenomics	**TR+AD**	

Practicals

Paper - MSZO403 (Developmental Biology and Computational Biology)

Group A - Developmental Biology

Topics	Allotted Teachers
1. Study of imaginal discs and development of (wing/leg) from Drosophila larva 2. Study of normal developmental (WM) stages of insect, fish, frog, chick and mouse (slide based) 3. Identification of whole mounts and histological sections of embryos, larvae, pupae and nymphs 4. Labelling chick notochord using immune-cytochemistry 5. Study of external influences on development (anuran amphibian/chicks/fish) 6. Isolation and characterization of Hematopoietic Stem cells from Peripheral blood /Rat Bone marrow 7. Identification of different types of stem cells (Chart based/Microscopical observation) 8. Characterization of different types of Hematopoietic cell lineage – From Peripheral Blood - Flow cytometric method (Demonstration) 9. Submission of preparations of WM different stages of development. 10. Submission of stem cell/Animal Regeneration preparation 11. Laboratory records 12. Viva-voce	**UKS & CM**

Group B - Computational Biology

Topics	Alloted Teachers
1. Handling of DOS, Unix commands and Windows operation: File management, Network commands and configuration 2. Sequence retrieval – nucleotide and protein 3. Sequence alignment, BLAST search, BLAT search 4. Protein pattern search, Motif search 5. Laboratory records 6. Viva-voce	**AD**

Paper – MSZO404 (Discipline Centric Elective Subject)
DE-5 (Parasitology and Microbiology)

Topics	Allotted Teachers	Alloted Classes
Microenvironment and the phases of parasitism	**SB**	
The vertebrate alimentary canal, blood, tissues and the other habitats	**SB**	
Parasite host specificity	**SB**	

Protozoan Parasites
   Origin and evolution of parasitic Protozoa
   Flagellates : General morphology and morphological stages
   Life cycle and pathogenicity of *Trypanosoma brucei gambiense*, *Trichomonas vaginalis*
   Physiology and biochemistry of Haemoflagellates
	SB	

Apicomplexa
   Ultrastructure of apical complex
   Biology and pathogenicity of *Toxoplasma gondii*, *Babesia bigemina*
	SB	

Malaria and Malarial Parasites
   General Biology, Characteristics of Species and Indian vectors of Plasmodium Causes, clinical symptoms, pathogenesis and treatment of malignant malaria
   Clinical course and different clinical manifestations
   Chemotherapy and general management of patients - Stable and unstable malaria - Epidemic and endemic situations - Autochthonous, imported, transfusion and other types
   Principles of malaria control - Malaria control programmes and strategies - NMCP, NMEP, MPO, PfCP, UMS, RBM, EMCP, NVBDCP
	SB	

General morphology with special reference to parasitic forms Structure, Life cycle and pathogenicity of Balantidium coli	**SB**	

Paper – MSZO405 (Parasitology and Microbiology) [DE5]

Topics	Alloted Teachers	Alloted Classes

Introduction to parasites
  Introduction to parasites. Mode of transmission, portal of entry and implications of parasitism
  Life cycle patterns and morphological adaptation in different group of helminthes
  Larval form of different helminthes		

Helminthology **Nematoda**: Definition of nematodes and their significance, general morphology, biology and life cycle patterns, structure of cuticle, excretory system and its taxonomic importance, reproductive system, copulatory structures: spicules, gubernaculum guiding and accessory pieces, the genital/caudal papillae and bursa, egg formation and types of eggs **Trematoda (Aspidogastrea)**: morphology, biology and life cycle of Aspidogasterconchicola **Trematoda (Digenea)**: Host and habitat, general morphology, biology and life cycle patterns, ultra-structure of tegument, excretory system and its taxonomic importance, reproductive system and egg formation and types of eggs **Cestodaria**: morphology and life cycle of Amphilina, Gyrocotyle **Eucestoda**: Systematic account and diagnostic features of various orders of Eucestoda, general morphology, biology and life cycle of various orders of Eucestoda, ultra-structure of tegument **Monogenea**: Morphology, life cycle, reproductive system and economic importance Type study – Polystoma, Diplozoon, Gyrodactylus **Acanthocephala**: General organization and morphology, lifecycle of Moniliformis		

Biology, Pathogenicity and Control
  Opisthorchis sinensis, Diphyllobothrium latum, Hymenolepis nana, Echinococcus granulosus, Ancylostoma duodenale, Loa loa
  Gastrointestinal nematode infection in man and ruminants and their antihelmintic treatment		

Helminthology
  Biology, pathogenicity and control of Schistosoma mansoni
  Human lymphatic filariasis and its transmission dynamics
  Chemotherapy and chemoprophylaxis: selective treatment, mass drug administration and medicated salt		

Vector Biology Biology, importance and control: Chrysops, tse-tse fly, mosquitoes (Aedes and Culex), fleas, lice		

Paper – MSZO406 (Parasitology and Microbiology) [DE5]

Topics	Alloted Teachers

1. Permanent preparation of protozoan parasite
2. Fixation and preservation of helminth parasites
3. Staining and mounting of trematode and cestode
4. Cytochemical and histochemical studies on protozoan and helminth parasites-DNA, polysaccharides, protein, lipid, alkaline and acid phosphatases
5. Clinical parasitological techniques
6. En-face view preparation of nematode parasites
7. Whole mount preparation of arthropod parasites and vectors
8. Isolation of DNA from parasitic helminth
9. Electrophoretic separation of DNA
10. Field visit
  a. Methods of parasite collection and preservation
  b. Study of parasite diversity in fishes from culture pond/fish market/forest stream
11. Laboratory records
12. Viva-voce
	DM+DB

Paper - MSZO 407: TERM PAPER / PROJECT WORK

(Based on Discipline-centric Elective Papers)
[Division of marks: Internal Assessment: 10; Submission (not less than 10,000 words excluding references): **25;**
Seminar Presentation and Viva: **15**

DEPARTMENT OF COMMERCE

TEACHING PLAN OF B.com (Honours)
(July 2023 – June 2024 Odd and Even Semester)

Month	Sem-1 (H)	Teachers Name	No. of Lecture	Sem-III (H)	Teachers Name	No. of Lecture	Sem-V (H)	Teachers Name	No. of Lecture
Jul	Financial Accounting I (Major) (Comm1011) Unit 1: Theoretical Framework Business Mathematics and Statistics I (Minor) (Comm1021#) Unit 1: Introductory Algebra Fundamentals of Accounting (Multi/Inter) (Comm1031@) Unit 1: Introduction of Accounting	KD BH BK	6 15 10	Financial Accounting II (Major) (Comm3011) Unit 1: Partnership Accounts-II Cost and Management Accounting II (Major) (Comm3012) Unit 1: Unit or Output Costing, Job costing and Batch Costing Fundamentals of Finance (Multi/Inter) (Comm3031) Unit-1: Introduction to Finance Entrepreneurship Development (SEC) (Comm3051)	BH MLT KD SPD	12 5 10 6 12	CC-11: TAXATION-I (5.1 CH) Unit1: Introduction CC-12: AUDITING (5.2 CH) Unit 1: Introduction DSE-1: MANAGEMENT ACCOUNTING (5.3.1 CH) Unit 1: Introduction OR DSE-1: FUNDAMENTALS OF BANKING AND INSURANCE (5.3.2 CH) Unit 1: Introduction DSE-2:INDIAN FINANCIAL SYSTEM (5.4.1 CH) Unit 1: Financial System and its Components OR DSE-2: ADVERTISING (5.4.2 CH) Unit 1: Introduction	KD SPD MLT BK BK BH	15 10 10 13 15 10

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Head
Department of Commerce
Suri Vidyasagar College

Month	Subject/Unit			Subject/Unit			Subject/Unit		
	E-Commerce (SEC) (Comm1051) **Unit 1: Introduction**	SPD		**Unit 1: Introduction to Entrepreneurship & Entrepreneur**					
Aug	Financial Accounting I (Major) (Comm1011) **Unit 2: a) Single Entry:**	MLT	6	**Financial Accounting II (Major) (Comm3011) Unit 2: Accounting for Hire Purchase and Instalment purchase**	KD	5	CC-11: TAXATION-I (5.1 CH) Unit 2: Agricultural Income	MLT	5
			15				CC-12: AUDITING (5.2 CH) Unit 2: Audit of Companies	SPD	15
	Business Mathematics and Statistics I (Minor) (Comm1021#) **Unit 2: Mathematics of Finance**	BH	15	Cost and Management Accounting II (Major) (Comm3012) **Unit 1: Unit or Output Costing, Job costing and Batch Costing**	BH	15	DSE-1: MANAGEMENT ACCOUNTING (5.3.1 CH) Unit2:Comparative financial statement and common size financial statement: OR	KD	15
						6	DSE-1: FUNDAMENTALS OF BANKING AND INSURANCE (5.3.2 CH) Unit 2: Cheques and Paying Banker	BK	13
	Fundamentals of Accounting (Multi/Inter) (Comm1031@) **Unit 2:**	BK		**Fundamentals of Finance (Multi/Inter) (Comm3031) Unit-2: Capital Budgeting Decision**	MLT	9			15
							DSE-2 INDIAN FINANCIAL SYSTEM (5.4.1 CH)	BK	15

Month	Subject / Unit	Fac	No.	Subject / Unit	Fac	No.	Subject / Unit	Fac	No.
	Recording of Transactions and Preparation of Trial Balance E-Commerce (SEC) (Comm1051) **Unit1: Introduction**	SPD		Entrepreneurship Development (SEC) (Comm3051) **Unit 2: Family Businesses & MSMEs**	SPD		Unit 2: Financial Markets OR DSE-2: ADVERTISING (5.4 2 CH) Unit 2: Media Decisions	SPD	
Sept	Financial Accounting I (Major) (Comm1011) **Unit 2: b) Sectional Balancing and Self-Balancing Ledger**	KD	6 13 20	**Financial Accounting II (Major) (Comm3011) Unit 3: Accounting for Inland Branches and Departmental Accounts**	BK	18 15	CC-11: TAXATION-I (5.1 CH) Unit 3: Income under the head Salaries and its Computation	KD	10
				Cost and Management Accounting II (Major) (Comm3012) **Unit-2: Contract Costing**	MLT	10 8	CC-12: AUDITING (5.2 CH) Unit 3: Audit Report and Certificates	SPD	12
	Business Mathematics and Statistics I (Minor) (Comm1021#) **Unit 3: Matrix Algebra and Determinants**	BK		**Fundamentals of Finance (Multi/Inter) (Comm3031) Unit-3 Capital Structure Decision**	KD	9	DSE-1: MANAGEMENT ACCOUNTING (5.3.1 CH) Unit 3: Ratio Analysis	MLT	10
							OR DSE-1: FUNDAMENTALS OF BANKING AND INSURANCE (5.3.2 CH) Unit 3: Banking Lending	BK BK	13
							DSE-2:INDIAN FINANCIAL SYSTEM (5.4.1 CH)		7

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Month	Subject / Unit			Subject / Unit			Subject / Unit		
	Fundamentals of Accounting (Multi/Inter) (Comm1031@) **Unit 3: Financial Statement**	MLT		Entrepreneurship Development (SEC) (Comm3051) **Unit 3: Stimulation, Support and Sustainability in Entrepreneurship**	BH		Unit 3: Financial Institutions OR DSE-2: ADVERTISING (5.4.2 CH) Unit 3: Message Development	BH	15
	E-Commerce (SEC) (Comm1051) **Unit 2: E-CRM and SCM**	SPD							
Oct	Financial Accounting I (Major) (Comm1011) **Unit 3: Consignment Accounting:**	KD	10 / 5	Financial Accounting II (Major) (Comm3011) **Unit 3: Accounting for Inland Branches and Departmental Accounts**	MLT	10	CC-11: TAXATION-I (5.1 CH) Unit 3: Income under the head Salaries and its Computation	MLT	10
	Business Mathematics and Statistics I (Minor) (Comm1021#) **Unit 4: Linear Programming**	BK	10	Cost and Management Accounting II (Major) (Comm3012) **Unit 3: Process Costing including Joint products and By-products**	KD	10	CC-12: AUDITING (5.2 CH) Unit 4: Audit of Different Institutions	BH	10
						10	DSE-1: MANAGEMENT ACCOUNTING (5.3.1 CH) Unit 3: Ratio Analysis OR DSE-1:	KD	10
	Fundamentals of Accounting			**Fundamentals of Finance** (Multi/Inter)	BK	9	FUNDAMENTALS OF BANKING AND INSURANCE (5.3.2 CH) Unit 4: Internet Banking	BK	10

	(Multi/Inter) (Comm1031@) **Unit 4:** **Financial** **Statement of** **Non-Profit** **Seeking** **Organizations** **(i) Non-Profit** **Seeking** **Organization:** **(ii) Receipts** **and Payments** **Account**	MLT		(Comm3031) **Unit-4 Working Capital** **Management** Entrepreneurship Development (SEC) (Comm3051) **Unit 4: Preparation for** **Entrepreneurial** **Ventures**	SPD	10	DSE-2 INDIAN FINANCIAL SYSTEM (5.4.1 CH) Unit 3: Financial Institutions OR DSE-2: ADVERTISING (5.4.2 CH) Unit 4: Measuring Advertising Effectiveness	BK SPD	6 8
	E-Commerce (SEC) (Comm1051) **Unit 3: Digital** **Payment**	SPD							
Nov	Financial Accounting I (Major) (Comm1011) Unit 4: Insurance Claim for Loss of Stock and Loss of Profits:	KD	16 5	Financial Accounting II (Major) (Comm3011) **Unit-4: Investment** **Accounts** Cost and Management Accounting II (Major)	KD MLT	8 7 15	CC-11: TAXATION-I (5.1 CH) Unit 4: Income under the head House Property and its Computation CC-12: AUDITING (5.2 CH) Unit 5: Special Areas of Audit DSE-1	KD SPD MLT	10 8

		5	(Comm3012) Unit-4: Service Costing or Operating Costing		8	MANAGEMENT ACCOUNTING (5.3.1 CH) Unit 4: Cash Flow Statement OR		10
Business Mathematics and Statistics I (Minor) (Comm1021#) Unit 5: Descriptive Statistics a)Introduction: b) Measures of Central Tendency	BH				8	DSE-1: FUNDAMENTALS OF BANKING AND INSURANCE (5.3.2 CH) Unit 5: Insurance	BK	
			Fundamentals of Finance (Multi/Inter) (Comm3031) Unit-4 Working Capital Management	BK				7
					10	DSE-2 INDIAN FINANCIAL SYSTEM (5.4.1 CH) Unit 4: Financial Services	BK	10
			Entrepreneurship Development (SEC) (Comm3051) Unit 5: Start-up Ventures: Establishment & Operations	SPD		OR DSE-2: ADVERTISING (5.4.2 CH) Unit 4: Measuring Advertising Effectiveness	BH	7
Fundamentals of Accounting (Multi/Inter) (Comm1031@) Unit 4: iii) Income and Expenditure Account: (iv) Financial Statement:	BK							

	E-Commerce (SEC) (Comm1051) **Unit 4: ERP**	**SPD**							
Dec	Financial Accounting I (Major) (Comm1011)	**MLT**	17	Financial Accounting II (Major) (Comm3011) **Unit 5: Company Accounts**	**BH**	**8**	CC-11: TAXATION-I (5.1 CH) Unit 5: Income from Profits and Gains of Business or Profession	**MLT**	15
	Unit 5: Partnership Accounts – I		5	Cost and Management Accounting II (Major) (Comm3012) **Unit 5: Marginal Costing and Cost Volume-Profit Analysis**		**7**			
	Business Mathematics and Statistics I (Minor) (Comm1021#)	**BK**	5		**MLT**	**10**	CC-12: AUDITING (5.2 CH) Unit 5: Special Areas of Audit	**SPD**	7
	Unit 5: c) **Measures of Dispersion:**					**8**	DSE-1: MANAGEMENT ACCOUNTING (5.3.1 CH) Unit 5: Budget and Budgetary Control	**KD**	10
	d) **Moments, Skewness and Kurtosis:**			**Fundamentals of Finance** (Multi/Inter) (Comm3031) **Unit-5 Dividend Decision**	**KD**	**8**	OR DSE-1: FUNDAMENTALS OF BANKING AND INSURANCE (5.3.2 CH) Unit 5: Insurance	**BK**	6
	Fundamentals of Accounting	**BK**		Entrepreneurship Development (SEC) (Comm3051)	**SPD** **SPD**	**15**	DSE-2 INDIAN FINANCIAL SYSTEM (5.4.1 CH) Unit 5: Leasing and	**BK**	10

Month	Sem-II (H)			Sem-IV (H)			Sem-VI (H)		
	(Multi/Inter) (Comm1031@) **Revision**			**Unit 5: Start-up Ventures: Establishment & Operations**			hire–purchase OR DSE-2: ADVERTISING (5.4.2 CH) Unit 5: Advertising Agency	SPD	10
	E-Commerce (SEC) (Comm1051) Unit 5: New Trends in E-Commerce	SPD							
	Sem-II (H)			**Sem-IV (H)**	BK		**Sem-VI (H)**	KD	
Jan	Cost and Management Accounting I (Major) (Comm2011) Unit 1: Introduction to Cost and Management Accounting	KD / SPD	10 / 10 / 5	Management Theory and Practice (Major) (Comm4011) **Unit 1: Introduction**		10	CC-13: FUNDAMENTALS OF FINANCIAL MANAGEMENT (6.1 CH) Unit 1: Introduction		10
				Marketing Management (Major) (Comm4012) **Unit 1: Introduction to Marketing Management**	MLT	15	CC-14: TAXATION-II (6.2 CH) Unit I	MLT	15
					BH		DSE-3: FUNDAMENTALS OF INVESTMENT (6.3.1 CH)	BK	
	Principles of Economics-1 (Minor) (Comm2021#) **Unit 1: Demand-Supply Framework & Equilibrium**	BH		Direct Tax I (Major) (Comm4013) **Unit-1:a) Basic Concepts and Definitions under Income Tax Act, 1961:**	BK	12 / 7	Unit 1: Investment Environment OR DSE-3: TAX PROCEDURES AND MANAGEMENT (6.3.2 CH) Unit 1: Introduction	KD	10 / 10
				Principles of Economics II (Minor) (Comm4021)	SPD	13	DSE-4: INTERNATIONAL BUSINESS (6.4.1 CH) Unit 1: Introduction to International Business	SPD	13

	Fundamentals of Management (Multi/Inter) (Comm2031@) **Units 1: Introduction to Management** Computer Application in Business (SEC) (Comm2051) **Unit 1: Computer Basics**			**Unit 1: Factor Price Determination** Business Mathematics and Statistics II (Minor) (Comm4022) **Unit 1: Function, Limit and Continuity:**						
Feb	Cost and Management Accounting I (Major) (Comm2011) **Unit 2: Material Cost**	MLT SPD	15 10	Management Theory and Practice (Major) (Comm4011) **Unit 1: Introduction** Marketing Management (Major) (Comm4012) **Unit 2: Consumer**	BK KD	10 12	CC- 13 FUNDAMENTALS OF FINANCIAL MANAGEMENT (6 1 CH) Unit 2: Sources of Finance, Cost of Capital and Capital Structure Analysis CC-14: TAXATION-II (6 2 CH) Unit 2	MLT KD	10 15

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	Principles of Economics-I (Minor) (Comm2021#) **Unit 2: Production and Cost**	BK	12	**Behaviour & Marketing Strategies**	SPD		DSE-3 FUNDAMENTALS OF INVESTMENT (6.3.1 CH)	BK	10
				Direct Tax I (Major) (Comm4013) **Unit -2: Income under the "Salaries" and its computation**	BK	13 10	Unit 2: Fixed Income Securities OR DSE-3: TAX PROCEDURES AND MANAGEMENT (6.3.2 CH) Unit 2: Tax Management I	KD	15
	Fundamentals of Management (Multi/Inter) (Comm2031@) **Units 2: Planning**			Principles of Economics II (Minor) (Comm4021) **Unit 2: Principles of Taxation and Government Revenue and Expenditure**	SPD	13	DSE-4: INTERNATIONAL BUSINESS (6.4.1 CH) Unit 2: Theories of International Trade	SPD	13
	Computer Application in Business (SEC) (Comm2051) **Unit1: Computer Basics**			Business Mathematics and Statistics II (Minor) (Comm4022) **Unit 2: Differential Calculus (without Trigonometric Applications)**					
Mar	Cost and Management Accounting I (Major) (Comm2011) **Unit 3: Employee**	KD SPD	15	Management Theory and Practice (Major) (Comm4011) **Unit 2: Planning and Strategic Planning** Marketing Management (Major)	BK MLT	15	CC- 13: FUNDAMENTALS OF FINANCIAL MANAGEMENT (6.1 CH) Unit 2: Sources of Finance, Cost of Capital and Capital Structure Analysis CC-14: TAXATION-II (6.2 CH) Unit 3: Computation of	KD MLT	10

Course / Unit			Course / Unit			Course / Unit		
/Labour Cost		10	(Comm4012) **Unit 2: Consumer Behaviour & Marketing Strategies**		10	Total Income and Tax Payable a) Rate of tax applicable to different assesses (except corporate assessee)		8
Principles of Economics-1 (Minor) (Comm2021#) **Unit 3: Market Structure**			Direct Tax I (Major) (Comm4013) **Unit-3: Income under the head "Income from House property" and its computation**					
	BK	15		BH		DSE-3 FUNDAMENTALS OF INVESTMENT (6.3.1 CH)	KD	
Fundamentals of Management (Multi/Inter) (Comm2031@) **Units 3: Organising**			Principles of Economics II (Minor) (Comm4021) **Unit 2: Principles of Taxation and Government Revenue and Expenditure**		15	Unit 3 Approaches to Equity Analysis OR DSE-3 TAX PROCEDURES AND MANAGEMENT (6.3.2 CH)	MLT	10
					10	Unit 3: Tax Management II		15
				BK				
Computer Application in Business (SEC) (Comm2051) Unit2: Operating System			Business Mathematics and Statistics II (Minor) (Comm4022) **Unit 2: Differential Calculus (without Trigonometric Applications)**	SPD	13	DSE-4 INTERNATIONAL BUSINESS (6.4.1 CH) Unit 3 International Organizations and Arrangements	SPD	13
Cost and Management Accounting I (Major) (Comm2011) Unit 4: Overheads	MLT / SPD	8	Management Theory and Practice (Major) (Comm4011) **Unit 3: Organising**	BK KD	15	CC-13 FUNDAMENTALS OF FINANCIAL MANAGEMENT (6.1 CH) Unit 3 Capital Budgeting Decision	MLT	15
						CC-14 TAXATION-II (6.2 CH)	KD	

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Month									
	Principles of Economics-I (Minor) (Comm2021#) **Unit 3: Market Structure**	BH	10	Marketing Management (Major) (Comm4012) **Unit 3: Managing the Product**		8	Unit 3: Computation of Total Income and Tax Payable b) Computation of tax liability of an individual		7
	Fundamentals of Management (Multi/Inter) (Comm2031@) **Units 4: Staffing, Directing and Controlling**		13	Direct Tax I (Major) (Comm4013) **Unit 4: Income under the head "Profits and Gains of Business and Profession" and its computation (Individual Assessee).**	SPD	7	DSE-3: FUNDAMENTALS OF INVESTMENT (6.3.1 CH) Unit 3: Approaches to Equity Analysis	BK	10
				Principles of Economics II (Minor) (Comm4021) **Unit 3: Principles of International Trade**	BK	7	OR DSE-3: TAX PROCEDURES AND MANAGEMENT (6.3.2 CH) Unit 4: Tax Management III	KD	8
	Computer Application in Business (SEC) (Comm2051) **Unit 3: Number System and Binary Arithmetic and Logic Gate**			Business Mathematics and Statistics II (Minor) (Comm4022) **Unit 3: Integral Calculus (without Trigonometric Applications)**	SPD	5	DSE-4: INTERNATIONAL BUSINESS (6.4.1 CH) Unit 4: Developments and Issues in International Business	SPD	8
May	Cost and Management Accounting I (Major)	KD	8	Management Theory and Practice (Major) (Comm4011) **Units 4: Directing**	BK	10	CC-13: FUNDAMENTALS OF FINANCIAL MANAGEMENT (6.1 CH) Unit 4: Working Capital Management	KD	15

(Comm2011) **Unit 5: Cost Accounting Systems**	SPD	15	Marketing Management (Major) (Comm4012) **Unit 4: Pricing & Distribution Decisions**	MLT	7	CC-14: TAXATION-II (6.2 CH) Unit 4: GST: Basic concepts	MLT	15
Principles of Economics-I (Minor) (Comm2021#) **Unit 4: Selected Macroeconomic Principles**	BK	10	Direct Tax I (Major) (Comm4013) **Unit 5: a) Income under the head "Capital Gains" and its computation**	BH	8 5	DSE-3 FUNDAMENTALS OF INVESTMENT (6.3.1 CH) Unit 4: Portfolio Analysis and Financial Derivatives	BK	7
Fundamentals of Management (Multi/Inter) (Comm2031@) **Units 4: Staffing, Directing and Controlling**			Principles of Economics II (Minor) (Comm4021) **Unit 4: Economic Growth and Development**		6	OR DSE-3: TAX PROCEDURES AND MANAGEMENT (6.3.2 CH) Unit 4: Tax Management III	MLT	7
Computer Application in Business (SEC) (Comm2051) **Unit 4: Internet, and Its Applications**			Business Mathematics and Statistics II (Minor) (Comm4022) **Unit 4: Correlation and Regression**	BK SPD	13	DSE-4 INTERNATIONAL BUSINESS (6.4.1 CH) Unit 4: Developments and Issues in International Business	SPD	15

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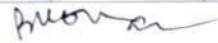|									
June	Cost and Management Accounting I (Major) (Comm2011) **Unit 5: Cost Accounting Systems**	MLT	10	Management Theory and Practice (Major) (Comm4011) **Unit 5: Communication, Coordination and Control**	BK	5	CC-13 FUNDAMENTALS OF FINANCIAL MANAGEMENT (6.1 CH) Unit 5: Dividend Decisions	MLT	10
	Principles of Economics-I (Minor) (Comm2021=) **Unit 5: Money in a Modern Economy**	SPD	10	Marketing Management (Major) (Comm4012) **Unit 5: Promotion Decisions & Recent Trends in marketing**	KD	13	CC-14 TAXATION-II (6.2 CH) Unit 5: GST Procedure	KD	5
	Fundamentals of Management (Multi/Inter) (Comm2031@) **Units 4: Staffing, Directing and Controlling**	BH	10	Direct Tax I (Major) (Comm4013) **Unit 5: a) Income under the head "Capital Gains" and its computation**	SPD	10	DSE-3 FUNDAMENTALS OF INVESTMENT (6.3.1 CH) Unit 5: Investor Protection	BK	10
						8	OR DSE-3: TAX PROCEDURES AND MANAGEMENT (6.3.2 CH) Unit 4: Tax Management III	KD	10
				Principles of Economics II (Minor) (Comm4021) **Unit 5: Poverty, Inequality and Development**	BK	13	DSE-4 INTERNATIONAL BUSINESS (6.4.1 CH) Unit 5: Export Promotion Measures	SPD	13
					SPD				

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Computer Application in Business (SEC) (Comm2051) Unit 5: Introduction to DBMS			Business Mathematics and Statistics II (Minor) (Comm4022) Unit 5: Index Numbers and Time Series				

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