**Lesson Plan**

Name of the Faculty : Dr. Yogesh Kumar

Discipline : Medical Lab Technology

Year : 1st SEM

Subject : BASIC MICROBIOLOGY-I

Lesson Plan : 30 weeks

Work load (lecture/practical) per week (in hours) : Lectures-03, practicals-04

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| **Week** | **Theory** | | | **Practical** | |
| **Lecture**  **day** | **Date** | **Topic (including assignment test)** | **Practical Day (2 hours lab each day), (2 hours each day\*2 days in week=4 weekly load)** | **Topic** |
| 1st | 1st |  | Definition, history, relationship of microorganisms to man. |  | Demonstration of safety rules (Universal precautions) in a microbiology laboratory. |
| 2nd |  | Safety guideline in a microbiology laboratory. Universal precautions |
| 3rd |  | Bio-safety cabinets: principle, types of bio-safety cabinets and their applications. |
| 2nd | 4th |  | i. Classification of micro-organisms |  | Preparation of cleaning agents and techniques of cleaning glasswares. |
| 5th |  | ii. Morphology of Bacteria |
| 6th |  | iii. Bacterial cell wall |
| 3rd | 7th |  | iv. Cell wall structures |  | Preparation of materials for sterilization in an autoclave and hot air oven. |
| 8th |  | v. Physiology of bacteria |
|  | 9th |  | vi. Bacterial growth and nutrition |
| 4th | 10th |  | **Sterilization- definition and types of sterilization.**  i. Physical methods of sterilization: Equipments used for sterilization, operation of autoclave and hot air oven, sterilization control and sterilization indicators. Sterilization by radiation and filtration (membrane). |  | Sterilization in autoclave and hot air oven and placing of the sterilization indicators. |
| 11th |  |
| 12th |  |
| 5th | 13th |  | Chemical methods of Sterilization: Antiseptics and disinfectants- Definition, types, properties and uses of common disinfectants and disinfectants (e.g. Formaldehyde, Ethylene oxide, phenol compounds, Alcohol, hypochlorite). Definition of Phenol coefficient and determination Phenol coefficient by Rideal Walker method. |  | Sterilization by filtration by membrane method. |
| 14th |  |
| 15th |  |
| 6th | 16th |  | **Microscopy and staining techniques**  i. Handling of a compound microscope. Care and maintenance of different parts of a compound microscope. Principle of working of fluorescent microscope. |  | Handling and care of different types of microscopes. |
| 17th |  |
| 18th |  |
| 7th | 19th |  | ii. Staining techniques: Method of smear preparation. Differential staining methods: Gram staining, AFB staining, Albert’s staining, staining of capsule. Preparation of staining solutions and their storage. |  | Staining techniques: Gram, Albert’s staining, ZiehlNeelsonstaining, Capsule and bacterial spore staining. |
| 20th |  |
| 21st |  |
| 8th | 22nd |  | **Culture Media and culture techniques**  i. Definition, synthetic and non-synthetic media. Types of culture media: liquid, and solid media, routine laboratory media (Basal. Enriched, selective, enrichment, indicator, transport, and storage) with two examples of each type. |  | Demonstration of bacterial motility by hanging drop technique. |
| 23rd |  |
| 24th |  |
| 9th | 25th |  | ii. Different types of inoculating loops, different types of swabs and their uses. Types of bacterial culture: broth culture, stab culture, slant culture. Culture techniques: streak plate, pour plate, spreading/ lawn culture, .Aerobic and anaerobic culture, Isolation of pure cultures and disposal of cultures. |  | Preparation of culture media: Nutrient agar, blood agar, chocolate agar, MacConkey agar, DCA, XLD and Peptone water. Inoculation of bacteria on these culture media by aerobic / anaerobic culture method. |
| 26th |  |
| 27th |  |
| 10th | 28th |  | REVISION |  | Isolation of organisms in pure culture, study of colony characteristics and demonstration of haemolysis on blood agar. |
| 29th |  | REVISION |
| 30th |  | REVISION |
| 11th | 31st |  | REVISION |  | REVISION |
| 32nd |  | REVISION |
| 33rd |  | REVISION |
| 12th | 34th |  | REVISION |  | REVISION |
| 35th |  | REVISION |
| 36th |  | REVISION |
| 13th | 37th |  | REVISION |  | REVISION |
| 38th |  | REVISION |
| 39th |  | REVISION |
| 14th | 40th |  | REVISION |  | REVISION |
| 41st |  | REVISION |
| 42nd |  | REVISION |
| 15th | 43rd |  | REVISION |  | REVISION |
| 44th |  | REVISION |
| 45th |  | REVISION |

**Lesson Plan**

Name of the Faculty : Dr. Yogesh Kumar

Discipline : Medical Lab Technology

Year : 1st SEM

Subject : Introduction to Hematology

Lesson Plan : 30 weeks

Work load (lecture/practical) per week (in hours) : Lectures-03, practicals-04

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Week** | **Theory** | | | **Practical** | |
| **Lecture**  **day** | **Date** | **Topic (including assignment test)** | **Practical Day (2 hours lab each day), (2 hours each day\*2 days in week=4 weekly load)** | **Topic** |
| 1st | 1st |  | **Introduction to haematology**  1.1 Various glassware/plastic-ware used in Haematology Labs. (Hb. Tube, Hb. Pipette, RBC Pipette, WBC Pipette). |  | 1. Parts of microscope (Monocular & Binocular): Its function and care. |
| 2nd |  | 1.2 Introduction to blood.  1.3 Definition & Composition |
| 3rd |  | 1.4 Cells-WBC (Granulocytes-Neutrophils, Eosinophils& Basophils), (Agranulocytes-Lymphocytes & Monocytes), RBC, Platelets. |
| 2nd | 4th |  | 1.5 Plasma & its components  1.6 Function-cell functions & plasma functions. |  | 2. Parts of centrifuge: Its function and care.  . |
| 5th |  | 1.7 Formation of blood (Erythropoiesis) |
| 6th |  | (Leukopoiesis&Thrombopoiesis) |
| 3rd | 7th |  | Definition  2.1 Various types along with their mode of action, merit and demerit its of each Anticoagulant vials |  | 3. Parts of Blood Mixer: Its function and care |
| 8th |  | 2.3 Difference between Plasma and serum |
|  | 9th |  | **Venous blood collection**  3.1 Venipuncture : materials and equipment required for venipuncture |
| 4th | 10th |  | 3.2 Preparation of patients for venipuncture  3.3 Applying tourniquet  3.4 Selection and preparing the venipuncture site |  | 4. Cleaning and drying of glassware |
| 11th |  |
| 12th |  |
| 5th | 13th |  | 3.5 Performing venipuncture  3.6 Care of venipuncture site |  | **UNIT II**  5. Estimation of Differential Leukocyte count. |
| 14th |  |
| 15th |  |
| 6th | 16th |  | 3.7 Disposable of blood, syringes, needle and lancets. |  | **UNIT III**  6. Preparation of various anticoagulants. |
| 17th |  |
| 18th |  |
| 7th | 19th |  | **The capillary puncture**  4.1 Capillary puncture site  4.2 Materials and equipment required for capillary puncture site  4.3 Selecting and preparing the puncture site |  | **UNIT IV**  7. Collection of blood sample by venipuncture. |
| 20th |  |
| 21st |  |
| 8th | 22nd |  | 4.4 Techniques performing the puncture site  4.5 Collection of blood sample  4.6 Care of the capillary puncture site  4.7 Vacutainer system for blood collection |  | 8. Collection of blood sample by capillary puncture |
| 23rd |  |
| 24th |  |
| 9th | 25th |  | **Romanowsky stains (Leishman, Giemsa)**  5.1 Preparation and theory  5.2 Choice of slide and spreader |  | **UNIT V**  9. Preparation of peripheral blood film (PBF). |
| 26th |  |
| 27th |  |
| 10th | 28th |  | 5.3 Preparation of blood film  5.4 Characteristics of good blood smear |  | 10. Preparation of stain. |
| 29th |  | 5.5 Examination of blood smear |
| 30th |  | 5.6 Identification of blood cell |
| 11th | 31st |  | REVISION |  | REVISION |
| 32nd |  | REVISION |
| 33rd |  | REVISION |
| 12th | 34th |  | REVISION |  | REVISION |
| 35th |  | REVISION |
| 36th |  | REVISION |
| 13th | 37th |  | REVISION |  | REVISION |
| 38th |  | REVISION |
| 39th |  | REVISION |
| 14th | 40th |  | REVISION |  | REVISION |
| 41st |  | REVISION |
| 42nd |  | REVISION |
| 15th | 43rd |  | REVISION |  | REVISION |
| 44th |  | REVISION |
| 45th |  | REVISION |

**Lesson Plan**

Name of the Faculty :

Discipline : Medical Lab Technology

Year : 1st Year

Subject : Basic chemistry

Lesson Plan : 30 weeks

Work load (lecture/practical) per week (in hours) : Lectures-02, practicals-02

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| **Week** | **Theory** | | **Practical** | |
| **Lecture**  **day** | **Topic(including assignment test)** | **Practical Day (1 lab=2 hours )** | **Topic** |
|  |  | Introduction to the whole syllabus of Basic Chemistry | 1st & 2nd | Volumetric analysis and study of apparatus used therein. Simple problems on volumetric analysis equation |
| Basic Concepts of Chemistry Definition of chemistry and its importance |
|  | S.I. Units of pressure, volume, density, specific gravity, surface tension and viscosity | 3rd &4th | Preparation of standard solution of oxalic acid or potassium dichromate |
| Matter, element, compound and mixtures, atoms, molecules, ions, symbols and formulae (recapitulation only) |
|  |  | symbols and formulae (recapitulation only) | 5th &6th | Determine the strength of solution of HCl with the help of a solution of NaOH and an intermediate solution of standard oxalic acid |
| Writing chemical formulae of simple chemical compounds |
|  | calculation of percentage composition of chemical compounds | 7th & 8th | Estimation of total dissolved solids (TDS) in water sample gravimetrically |
| Chemical equations, thermo-chemical equations |
|  |  | balancing of chemical equations by HIT and TRIAL method | 9th & 10th | Estimation of total alkalinity of water volumetrically |
| Assignment 1-Atomic Structure and Chemical Bonding , Introduction to atom and its constituent particles |
|  | Dalton’s atomic theory, Rutherford’s and Bohr’s model of atom | 11th &12th | viva |
| Atomic number, mass number, isotopes, isobars and isotones |
|  |  | Concept of atomic orbitals, shapes of s and p- orbitals, quantum numbers | 13th & 14th | Determine the pH of given sample using pH meter |
| Aufbau principle, Pauli’s exclusion principle |
|  | Hund’s rule and electronic configuration of elements (upto Z=30) | 15th & 16th | Determine the percentage purity of commercial sample like blue vitriol, 12.5 g. of which have been dissolved per litre. Given M/20 Na2S2O3 |
| Chemical bond, types of chemical bonding: ionic and covalent |
|  |  | Sources of water, Types of water based on dissolved salts. | 17th&18th | viva |
| Hard water, soft water , Units to measure water hardness in ppm simple numericals, degree Clark & degree French |
|  | Disadvantages of use of hard water in domestic and industrial applications | 19th&20th | Determination of solubility of a solid at room temperature |
| Methods to remove water hardness by , Ion exchange process , Lime-soda process |
|  |  | Reverse Osmosis method 3.5 Quality criteria of drinking water as per BIS |
| Concept of homogenous solution, brief introduction of the terms (i) Ionization (ii) Acidity (iii) Basicity | 21st&22nd | To verify the first law of electrolysis (electrolysis of copper sulphate solution using copper electrode |
|  | equivalent weight and gram equivalent weight with suitable examples 4.2 Strength of a solution (i) Normality (ii) Molarity | 23rd&24th | VIVA |
| Molality as applied in relation to a solution. Definition of pH |
|  |  | simple numericals and different industrial applications of pH. Buffer solution and applications of buffer. | 25th&26th | Iodometric titration |
| Electronic concept of oxidation and reduction 5.2 Definition of the terms: Electrolytes, Non-electrolytes |
|  | Faraday’s Laws of Electrolysis and simple numericals Different industrial applications of ‘Electrolysis | 27th &28th | Oxidation reduction titration |
| Applications of redox-reactions in battery technology such as (i) Dry cell (ii) lead acid battery and (iii) Ni-Cd battery |
|  |  | Brief introduction to Environmental Chemistry and Pollution | 29th&30th | viva |
| Causes and effects of air, water and soil pollutions |
|  | Role of chemistry in controlling air, water and soil pollutions | 31st&32nd | Acid-base titrations |
| General idea of ozone depletion, global warming |
|  |  | General idea of ozone depletion, global warming | 33rd&34th | Estimation of carbohydrates by benedicts methods |
| introduction and importance of organic compounds,comparison of organic and inorganic compounds |
|  | Properties of carbon and hydrogen | 35th&36th | VIVA |
| Properties of carbon and hydrogen |
| IUPAC nomenclature-Hydrocarbons,Alcohols | 37th&38th | Estimation of proteins by acitic acid |
| IUPAC-Ethers,Aldehydes and ketones |
|  |  | IUPAC-carboxylic acids and revision | 39th&40th | VIVA |
| preparation ,properties and uses of saturated hydrocarbons |
|  | Preparations,properties and uses of unsaturated hydrocarbons | 41st&42nd | Revision of experiments |
| Uses of saturated & unsaturated hydrocarbons |
|  |  | Sources of hydrocarbons | 43rd&44th | VIVA |
| Preparation ,properties and uses of halogen derivatives of hydrocarbons |
|  | Introduction,classification,preparation and properties ,uses of Methyl alcohol | 45th&46th | Estimation of proteins by salphosalicyclic acid |
| Introduction,classification,preparation and properties ,uses of Ethyl alcohol |
|  |  | Introduction,classification,preparation and properties ,uses of glycerol | 47th&48th | Estimation of lipids by direct method |
| Introduction ,classification,preparation and properties ,uses of Diethyl Ether,methanol,ethanal |
|  | Amines-structure of amines groups-primary,secendory,tertiary | 49th&50th | Acid base experiment doubt |
| Important methods,preparation and properties of Amines |
|  |  | Introduction, classification, preparation, properties, uses of Methanoic acid, ethanoic acid | 51st&52nd | Revision of experiments |
| carbohydrates-definition, composition, classification |
|  | monosaccharides, disaccharides, polysaccharides | 53rd&54th | Titrations overview |
| Lipids-definition,classification |
|  |  | Introduction to fatty acids, phospholipids, triglycerides | 55th&56th | Viva voice |
| Cholesterol and clinical importance of lipids |
|  | Proteins-classification, composition, molecular, structure, properties of amines, Clinical importance of proteins | 57th&58th | Doubt session |
| enzymes-definition, classification, chemical nature, factors affecting, clinical importance |
|  |  | Doubt class | 59th&60th | Viva voice |
| Revision |

**Lesson Plan**

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| **Name of the Faculty** | **:** |
| **Discipline** | **: MLT** |
| **Year** | **: 1st Year** |
| **Subject** | **: Fundamental of MLT** |

**Lesson Plan Duration : 30 weeks**

**Work Load (Lecture/Practical) per week (in hours): Lecture= 03, Practical=2**

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| **Week** | |  | **Theory** |  | **Practical** |
|  |  |  |  |  |  |
|  |  | **Lecture** | **Topic** | **Practical** | **Topic** |
|  |  | **Day** | **(including assignment / test)** | **Day** |  |
|  |  | 1 | **Basic Training of laboratory technicians**  1.1 Basic ethics of Medical laboratory Technology  1.2 Training of clinical laboratory technicians.  1.3 Medical laboratory professional - professionalism in laboratory workers,  1.4 Code of conduct and communication between physician and lab technician |  |  |
| 1. 1 | | 2 | 1 | 1. The Principal and procedure of autoclave and identify their parts– water bath, hot air oven, incubator |
|  |  | 3 |  |  |
| 2 |  | 4 | **Common Lab accidents and ways for its prevention**  1.5 First aid in the clinical laboratory  1.6 Storage and handling of dangerous chemicals  1.7 Common Laboratory hazards  1.8 Color coding of various Waste disposal containers in the labs |  | To demonstrate basic internal organization identifies their parts. Centrifuge colorimeter |
|  | | 5 | 2 |  |
|  |  | 6 |  |  |
|  |  | 7 |  | . To demonstrate basic internal organization of compound microscope identify their parts. |
| 3 | | 8 | 2.1Introduction to Basic Equipments in MLT  2.2 Different types of syringes used for blood collection.  2.3 Basic requirements of blood collection. | 3 |
|  |  |  |  |  |
|  |  | 9 |  |
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|  |  | 10 | **Principle, Care, Procedure and Application of the Basic Instruments Part-I**  3.1 Centrifuge (routine - low and high speed -table top)  3.2 Water Bath  3.3 Hot Air Oven  3.4 Incubator  3.5 Colorimeter  3.6 Compound Microscope (Monocular and Binocular) |  | 4. To demonstrate basic internal organization of identify their parts.pH meter chemical balance |
| 4 | | 11 | 4 |
|  |  |  |  |  |
|  |  | 12 |  |
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|  |  | 13 | **Principle, Care & Safe Operating Procedure and Application of the Basic Instruments Part-II**  4.1 pH Meter  4.2 Distillation unit  4.3 Balance (Physical and chemical)  4.4 Micro tom  4.5 Microbe filters (Seitz, Glass Scintered & Membrane) |  |  |
|  |  | 14 |  | 5. To demonstrate basic internal organization & identify their parts. Microtome Tissue Processing Unit Hematology Cell Counter  REVISION |
| 5 | | 5 |
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|  |  | 15 |  |
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|  |  | 16 | 5.1 Refrigerated Centrifuge  Ultra Centrifuge  5.2 Specialised Incubator  B.O.D. Incubator |  | REVISION |
|  |  | 17 | 6 |
| 6 |  |
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|  |  | 18 |  |
|  |  |  |  |
|  |  | 19 | Special Microscopes  1. Dark Field Microscope |  | REVISION |
|  | | 20 | Phase Contrast Microscope | 7 |
|  | 7 |  |  |  |  |
|  |  | 21 | 3. Florescence Microscope |  |
|  |  |  |  |
|  |  | 22 | 4. Electron Microscope  5 |  | REVISION |
|  | | 23 | .4Tissue Processing Unit  5. | 8 |
|  |  |  |  |  |  |
|  | 8 | 24 | 5BiochemistryAnalyzer  5. |  |
|  |  |  |  |
|  |  | 25 | 6Laminar Air Flow Hood& their Different Types  5. |  | REVISION |
|  | | 26 | Haematology Cell Counter | 9 |
|  | 9 |  |  |  |  |
|  |  | 27 | REVISION |  |
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|  |  | 28 |  |  |  |
| 10 | | REVISION | 10 |
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| 29 | REVISION |  |
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| 30 | REVISION |  |
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|  | |  | REVISION |  |  |
|  | | 31 | REVISION |  |  |
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|  | | 32 | REVISION | 11 |  |
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|  | | 34 | REVISION |  |  |
| 12 | | REVISION |  |  |
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| 35 | REVISION | 12 | REVISION |
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|  | | 36 | REVISION |  |  |
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| 13 | | 38 | REVISION | 13 |
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|  | | 39 | REVISION |  |
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|  | | 40 | REVISION |  |  |
| 14 | | 41 | REVISION | 14 |  |
|  | | 42 | REVISION |  | REVISION |
|  | |  | REVISION |  |  |
|  | | 43 | REVISION |  |  |
|  | | 44 | REVISION | 15 | REVISION |
| 15 | |  | REVISION |  |  |
|  | | 45 | REVISION |  |  |

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