RK UNIVERSITY	SYLLABUS
Course Title	**FUNDAMENTALS OF MLT & LAB MANAGEMENT SKILLS**
Course Code	**DML 111**
Course Credit	Lecture : 4
	Practical : 0
	Tutorial : 0
	Total : 4

DETAILED SYLLABUS

Sr. No.	FUNDAMENTALS OF MLT & LAB MANAGEMENT SKILLS SECTION I	Sessions Allotted 28
1	**GENERAL LABORATORY PRACTICE** A standardized clinical laboratory set up, Laboratory first aid kit, Responsibility of Lab worker, Personal cleanliness, Disinfection, Decontamination, Calibration of equipments and laboratory wares, Patient preparation for tests, noting carefully the test advised, Techniques of blood collection, phlebotomy and aftercare of patients.	
2	**CLINICAL LABORATORY INSTRUMENTATION AND MAINTENANCE** Principle, Maintenance and Use of Autoclave, Hot air oven, Sietz filter, Incubator, Centrifuge, Refrigerator, pH meter, Water distillation apparatus, Balance, Water bath, Vortex, Hot plate, Thermometer, Pipettes, Magnetic stirrer and Shaker	
	SECTION-II	**Sessions Allotted 28**
3	**ADVANCED INTRUMENTATION** Bright field Microscopy: Principle and working, Dark field Microscopy: Principle and working, Colorimeter and Spectrophotometer, Autoanalyzer, Semi and automated Cell counter, PCR, Lyophilizer, Microtomy, Chromatography, ELISA, RIA, Flame and photometer Electrophoresis.	

4	**LABORATORY SAFETY AND PRECAUTION** Organization of Laboratory and safety precaution regarding Laboratory hazards, Laboratory waste disposal and handling of infected specimens, Disposal of Biomedical waste, Biosafety levels (BSL)
5	**SPECIMEN HANDLING** Collection, Separation, preservation and transport of the biological specimens, anticoagulants.

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, black board, Audio/Video clips etc relevant to the content.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Minimum ten experiments shall be there in the laboratory related to course contents.

Students Learning Outcomes:

At the end of the course the students will be able to:

- Understand the duty of Lab worker.
- They are aware ethics of their profession.
- They can take care of Personal cleanliness and laboratory as well.
- Develop skills to handle some sophisticated instruments.
- They have insight of how to handle infected specimens and disposal of biomedical waste.
- They have awareness about Laboratory hazards and Biosafety levels.

Reference books:

1. Textbook of Medical Laboratory Technology Vol 1 & 2, P.B Godkar, 3rd edition, Bhalani Publishing House, 2005.
2. Biosafety in Microbiological and Biomedical Laboratories, Jonathan Y. Richmond, U.S. government printing office Washington, 1999.
3. Laboratory exercises in Microbiology, Harley Prescott, 5th edition, The McGraw−HillCompanies, 2002.

RK.UNIVERSITY	SYLLABUS
Course Title	**CLINICAL BIOCHEMISTRY**
Course Code	**DML-102**
Course Credit	Lecture : 4
	Practical : 0
	Tutorial : 0
	Total : 4

DETAILED SYLLABUS

Sr. No.	CLINICAL BIOCHEMISTRY SECTION I	Sessions Allotted 28
1	**Introduction to Clinical Biochemistry** Study of weights, volumes and Units, Inter-conversion of units, Measurements, Preparation of solution, Normal range, Different anticoagulants used in Clinical Biochemistry, its application and Mechanism of action. Automation in Clinical Biochemistry laboratory Electrophoresis, Chromatography., Colorimeter,	
2	**General Biochemistry of carbohydrates** Carbohydrates: Definition, structure, Classification, biological Properties. Overview of carbohydrate metabolism, disorders of carbohydrate metabolism: Diabetes mellitus, glycohemoglobins, hypoglycemias, galactosemia and ketone bodies. Various types of glucose tolerance tests. Glycogen storage diseases.	
3	**General Biochemistry of Lipids** Lipids: Definition, Classification, Properties, Phospholipids. Lipid metabolism: Cholesterol, Lipoproteins, VLDL, LDL, HDL, Atherosclerosis, Ketosis, Lipid Profile. Clinical inter relationships of lipids (sphingolipidosis and multiple sclerosis), lipoproteins and apolipoproteins. Lipid metabolism associated diseases, Lipidosis.	
Sr. No.	**SECTION II**	**Sessions Allotted 28**

4	**General Biochemistry of Amino acid and Proteins** Amino acids: Definition, Classification & Properties of Plasma proteins, Immunoglobulins, Protein metabolism: Transamination, Deamination, Urea cycle, protein metabolism associated disease like Phenyl ketonuria, Alkaptonuria etc.
5	**Organ function tests:** Evaluation of organ function tests: Assessment and clinical manifestations of renal, hepatic, pancreatic, gastric and intestinal functions. Clinical importance of bilirubin. **Diagnostic enzymes** Principles of diagnostic enzymology. Clinical significance of aspartate aminotransferase, alanine aminotransferase, creatine kinase, aldolase and lactate dehydrogenase. Enzyme tests in determination of myocardial infarction. Enzymes of pancreatic origin and biliary tract.

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, black board, Audio/Video clips etc relevant to the content.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Minimum ten experiments shall be there in the laboratory related to course contents.

Students Learning Outcomes:

At the end of the course the students will be able to:

- Develop skills to perform different biochemical test.
- Develop insight for interpretation of result and its clinical significance.
- Aware of Clinical importance of all the test and its criticalness..

Reference books:

1. Textbook Of Biochemistry For Medical Students, Vasudevan DM, 8th edition, Jaypee Brothers Medical Publishers, 2016.
2. Textbook of Medical Laboratory Technology Vol 1 & 2, P.B Godkar, 3rd edition, Bhalani Publishing House, 2005.
3. Guidelines for Good Clinical Laboratory Practices (GCLP) Indian Council of Medical Research, New Delhi.
4. Text Book of Biochemistry, Voet & Voet: 3rd Edition, John Wiley & Sons, 2018.

5. Lehninger, Principles of Biochemistry: Nelson and Cox, 7th Edition, WH Freeman, 2017

RK.UNIVERSITY	SYLLABUS
Course Title	**BASIC HEMATOLOGY AND BLOOD BANKING**
Course Code	**DML-113**
Course Credit	Lecture : 4
	Practical : 0
	Tutorial : 0
	Total : 4

DETAILED SYLLABUS

Sr. No.	BASIC HEMATOLOGY AND BLOOD BANKING SECTION I	Sessions Allotted 28
1	**Blood** Composition of blood and its function, Origin, development & morphology of blood cells. Common anticoagulants used-composition, amount, mechanism of action and methods of preparation of different types of vials. Venipuncture, Collection of Blood	
2	**Various Hematological Test** Methods of estimation of Haemoglobin. Methods of total counts of WBC, RBC & Platelets & fluids used. Methods of determination of PCV. Calculation of different red cell indices (Haemogram). Drawing of peripheral blood smear, staining & stain preparation. Bone marrow aspiration methods and staining & preparation of Tray for Bone marrow aspiration and biopsy. Differential leucocyte count (peripheral smear study). Reticulocyte staining, count and preparation of stain. Erythrocyte sedimentation rate (Procedure & reading only). Basic tests for coagulopathy –BT, CT, Ptime, APTT. Some special test – LE cell test, RBC Osmotic fragility & Foetal Hb%.	
3	**Blood Banking** Basic concepts of anaemia, Leukemia and hemorrhagic disorder. Introduction, Human blood group antigens, ABO blood group system and incompatibility, Rh blood group system and incompatibility, Blood Group (ABO & Rh) – methods of grouping & reverse grouping.	
Sr. No.	**SECTION II**	**Sessions Allotted 28**

4	**Blood Bank Organization** Organization**,** Documentation and Computerized records, Basic blood banking procedures – collection of blood, anticoagulants used, Technique of grouping and cross matching, different screening tests including Coomb's Test (Direct and Indirect) for incomplete antibodies. Selection and Screening of donors, Asepsis, Measurance, Preservation and Storage,
5	**Blood transfusion and hazards** Blood Transfusion Procedure, Complication of blood transfusion, Quality control in Blood Banking. Detect the time when to discard blood in Blood Bank. Apparatus used in blood banking, its care and cleaning.
6	**Cell separation** Cell separator and transfusion of various components of blood like Plasma and Platelet Separation, Preparation of red cell suspension, preparation of different blood components for use and how to serve a requisition.

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, black board, Audio/Video clips etc relevant to the content.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Minimum ten experiments shall be there in the laboratory related to course contents.

Students Learning Outcomes:

At the end of the course the students will be able to:

- Develop skills to perform various Haematological Test.
- Understanding of haematological changes in human body during different diseases
- Develop a thorough understanding of critical value and its clinical significance in Haematology.
- Have sound knowledge about Blood Transfusion Procedure, Complication in blood transfusion
- Understand the Quality control in Blood Banking and the precaution at the time of emergency.

Reference books:

1. Medical Laboratory Technology. Methods and Interpretations volume 1&2, Ramnik Sood 6th edition, JPB, 2009.
2. Medical Laboratory technology a procedure manual for routine diagnostic test – vol – I, II, III. Kanai L. Mukharjee, 3rd edition, Tata Mc graw hill pub. New Delhi, 2017.
3. Textbook of Medical Laboratory Technology Vol 1 & 2, P.B Godkar, 3rd edition, Bhalani Publishing House, 2005.
4. Basic & Applied Concepts of Blood Banking and Transfusion Practices, Kathy D. Blaney, and Paula R. Howard, 3rd Edition, Elsevier Inc., 2013.
5. Modern Blood Banking & Transfusion Practices, Denise Harmening, SIXTH EDITION, F. A. Davis Company, USA, 2012.
6. Kuby Immunology, Thomas J. Kindt, Barbara A. Osborne, Richard A. Goldsby, 6th Edition. W. H. Freeman & Company; 2006.

RK.UNIVERSITY	SYLLABUS
Course Title	**CLINICAL MICROBIOLOGY**
Course Code	**DML-114**
Course Credit	Lecture : 4
	Practical : 0
	Tutorial : 0
	Total : 4

DETAILED SYLLABUS		
Sr. No.	**IMMUNOLOGY** **SECTION I**	**Sessions Allotted 28**
1	**OVERVIEW OF MICROBIOLOGY** Milestones in Microbiology: Historical Development. Introduction to groups of microorganisms: Algae, Bacteria, Fungi, Protozoa and viruses. Distribution of microbes in Nature: Occurrence and Habitat place of the Microorganisms in living world: various microbial classification systems. Applications of Microorganisms in various fields: Scope of Microbiology	
2	**MORPHOLOGY OF BACTERIA** Size, Shape and Arrangement of bacteria. Bacterial Structures; Cell wall: structure and chemical composition of Gram positive and Gram-negative bacteria. External structures: flagella, pili, fimbriae, capsules, sheaths, prosthecae and stalks. Internal structure: cytoplasmic membrane, protoplasts and spheroplasts, membrane inclusions and intracellular membrane systems, cytoplasm, cytoplasmic inclusion bodies, vacuoles, nuclear material, bacterial spores and cyst, Sporogenesis.	
3	**MICROBIAL STAINING** Types of Stains: Natural and synthetic (Neutral, Acidic and Basic) Stains. Chemical structure of Stains. Physical and Chemical Theories of Staining. Staining of Bacteria: Simple and Differential Staining Procedures. General applications of stains other than bacteria.	
Sr. No.	**SECTION II**	**Sessions Allotted 28**

4	**PROKARYOTIC DIVERSITY** Introduction to Eubacteria; Gram Negative bacteria: General features; Aerobic/Microaerophilic motile, helical vibroid, Non-motile curved bacteria, Aerobic/Microaerophilic rods and cocci, Facultative anaerobes – rods, curved and helical bacteria. Gram Positive bacteria: General features; Endospore forming rods and cocci, Asporogenous rods, Mycobacteria and Actinomycetes.
5	**CLINICAL TECHNIQUES** Sterilization techniques (physical, chemical and radiation methods) and disinfection. Microbiological culture isolation, purification and storage techniques. Culture media, Culture methods, Identification of Bacteria: biochemical tests, Antibiotic sensitivity testing.Hospital-acquired infections & Laboratory Hazards.Qualitycontrolin Diagnostic Microbiology Automation in DiagnosticMicrobiology.

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, black board, Audio/Video clips etc relevant to the content.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Minimum ten experiments shall be there in the laboratory related to course contents.

Students Learning Outcomes:

At the end of the course the students will be able to:

- Develop a thorough understanding of the major groups of infectious microorganisms.
- Understanding of clinical techniques and Quality control in microbiology
- This course will equip them for work in the field of medical microbiology.

Reference books:

1. Microbiology. Pelczar M.J. Chan ECS. 5th edition. Tata MacGraw Hill publishing company limited.
2. Textbook of Medical Laboratory Technology Vol 1 & 2, P.B Godkar, 3rd edition, Bhalani Publishing House, 2005.
3. Medical Microbiology. Jawetz, Melnic and Adelberg's 5th edition, MacGraw Hill publishing company limited.
4. Medical Microbiology. Greenwood D, Slack R, Peutherer J, 15th edition. Churchil and Livinstone. 2007

RKUNIVERSITY	SYLLABUS	
Course Title	**Medical laboratory experiment 1**	
Course Code	**DML105**	
Course Credit	Lecture : 0	
	Practical : 12	
	Tutorial : 0	
	Total : 12	

DETAILED SYLLABUS

Sr. No.	**Medical laboratory experiment 1**	**Sessions Allotted 28**
	1. Introduction to medical Laboratory Technology 2. The responsibility of the Laboratory worker 3. Laboratory safety and Precaution 4. Introduction of instruments used in Laboratory (Autoclave, Hot air oven, Sietz filter, Incubator, Centrifuge, Refrigerator, pH meter, Water distillation apparatus, Balance, Water bath, Vortex, Hot plate, Thermometer, Pipettes, Magnetic stirrer and Shaker) 5. Introduction to advanced instrumentation (Bright field Microscopy, Dark field Microscopy, Colorimeter and Spectrophotometer, Autoanalyzer, Semi and automated Cell counter, PCR, Lyophilizer, Microtomy, Chromatography, ELISA, RIA, Flame and photometer Electrophoresis 6. Staining of Bacteria 7. To perform Gram's Staining 8. To perform Ziehl Neelsen Stain 9. Various culture test for different pathological organisms 10. Isolation and Identification of medically important bacteria and its antibiotic susceptibility (Sensitivity) testing 11. To study mobility of organisms 12. Estimation of glucose by GOD-POD method	

	13. Estimation of Cholesterol by DES or CHOD-PAP method 14. Estimation of Triglycerides by GPO-ESPAS method 15. Estimation of Bilirubin by Jendrassik and Grof method 16. Estimation of Urea by NED dye method 17. Estimation of Creatinine by alkaline picrate method 18. Estimation of Uric acid by Trinder peroxidase method 19. Estimation of HDL, LDL and VLDL by phosphotungastic acid method 20. Estimation of SGOT by UV Kinetic method 21. Estimation of SGPT by modified UV- Kinetic method 22. Determination of Haemoglobin 23. Total Erythrocyte count by Haemocytometry 24. Total count by Haemocytometry 25. Differential count of Leucocyte 26. Determination of Haematocrit (PCV) 27. Determination of Erythrocyte indices (Wintrobe's constant) 28. Determination of Erythrocyte sedimentation rate: Westergren's method 29. Determination of ESR by Wintrobes method 30. Determination of Platelet count 31. Determination of Reticulocyte count 32. To Determine presence of sickle cell in blood- Sickling test 33. Demonstration of LE Cell 34. Coagulation study: Determination of Bleeding time (Capillary method) 35. Determination of clotting time by Lee method 36. Determination of prothrombin time 37. ABO Blood Grouping to determine the ABO blood group of the given sample 38. To determine Rh type of blood by Du test 39. To detect incomplete antibodies in patient's blood using Direct Coomb's test 40. To detect incomplete antibodies in patient's blood using Indirect Coomb's test 41. To perform the compatibility test i.e. Cross matching	

RK UNIVERSITY	SYLLABUS
Course Title	**APPLIED HISTOPATHOLOGY & CYTOLOGICAL TECHNIQUES**
Course Code	**DML201**
Course Credit	Lecture : 4
	Practical : 0
	Tutorial : 0
	Total : 4

DETAILED SYLLABUS		
Sr. No.	**APPLIED HISTOPATHOLOGY & CYTOLOGICAL TECHNIQUES** **SECTION I**	**Sessions Allotted 28**
1	**Introduction** to Histology, Handling Biopsy Specimen, Instruments in Histopathology (Microtome), The manipulation and use of microtomes, Microtome knives and methods of sharpening. Quality control in Histopathology , Fixation of tissue-different fixatives and their mode of action, Various methods of preparation of tissue section.	
2	**Tissue processing:** Different stages of tissue processing i.e. dehydration, clearing, embedding, Processing of tissues-protocol for manual & automated tissue processors, paraffin embedding & preparation of blocks, section cutting, picking up sections, drying sections, Methods in common use for decalcification, recognition and correction of faults in section cutting, preparation of reagents.	
3	**Staining :** Objective and principle of different histopathological staining, preparation and use of Hematoxyline and eosin stain. Reticulin, PAS, Van-Gieson, Massion's trichrome, Lipid & Mucin stains & Perl's stain and Mounting specimens.	
	SECTION-II	**Sessions Allotted 28**

4	**Frozen section apparatus: (**cryostat) A theoretical knowledge of its application, construction and use. Different techniques & application and frozen section/cryostat. Preservation of slides and blocks
5	**Diagnostic Cytology:** Preparation of cytosmear and H&E, Papanicolaou & MGG staining of different body fluids. Fine Needle Aspiration cytology and exfoliative cytology, Buccal Smear examination. Cytochemistry & immunohistochemistry.

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, black board, Audio/Video clips etc relevant to the content.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Minimum ten experiments shall be there in the laboratory related to course contents.

Students Learning Outcomes:

At the end of the course the students will be able to:

- Develop understanding about different histological techniques
- Develop skills to handle some sophisticated instruments and interpretation of results.
- Able to identify the difference between normal and abnormal cell and its structure.
- Grabbing knowledge about Cytochemistry & immunohistochemistry which will be help full in medical laboratory.

Reference books:

1. Basic and Advanced Laboratory Techniques in Histopathology and Cytology, Pranab Dey, Springer Singapore,2018.
2. Textbook of Medical Laboratory Technology Vol 1 & 2, P.B Godkar, 3rd edition, Bhalani Publishing House,2005.
3. Medical Laboratory Technology Medical Laboratory Technology (Volume I-III): Procedure Manual for Routine Diagnostic Tests, Mukherjee l. Kanai, 2 edition, McGraw Hill Education, 2010.
4. Medical Laboratory Technology, Methods and Interpretations(volume I&II), Ramnik Sood, , 6th Ed., Jaypee, 2009.

5. Techniques in Histopathology & Cytopathology, Sadhana Vishwakarma, First edition, Jaypee Brothers Medical Publishers,2017.

RK.UNIVERSITY	SYLLABUS
Course Title	**CLINICAL PATHOLOGY AND PARASITOLOGY**
Course Code	**DML202**
Course Credit	Lecture : 4
	Practical : 0
	Tutorial : 0
	Total : 4

DETAILED SYLLABUS

Sr. No.	CLINICAL PATHOLOGY AND PARASITOLOGY SECTION I	Sessions Allotted 28
1	Normal microbial flora of human body: Microbiome of human system-skin, oral cavity, respiratory tract, gastrointestinal tract and urogenital tract, Significance of normal microflora. Concept of Gnotobiology, Probiotics & prebiotics. Host parasite interaction: Host-Parasite relationships, virulence factors, epidemiology, control measures and prevention. Nonspecific Host Resistance, Microbial Mechanisms for Escaping Host Defenses: Evasion of Host Defenses by Virus and Bacteria	
2	Infection: Types of infection, source of infection, reservoirs and vehicles of infection, predisposing factors. The Epidemiology of Infectious Disease: Epidemiological Terminology, Measuring Frequency, Recognition of an Infectious Disease in a Population, Recognition of an Epidemic, Virulence and the Mode of Transmission, Emerging and Reemerging Infectious Diseases and Pathogens, Control of Epidemics, Bioterrorism Preparedness.	
3	**Bacterial diseases:** General characteristics, pathogenic properties, colonization, invasion Source,pathogenesis, epidemiology and diagnostic methods of Infection caused by Gram positive bacteria: *Stephylococcus, Streptococcus, Corynebacterium diphtheria, Bacillus anthracis, Clostridium, Vibrio cholerae* . Gram negative bacteria: *Neisseria (meningitis, gonorrhoea) , Escherichia coli, Klebsiella, Proteus, Pseudomonas, Shigella dysenteria, and Salmonella typhi* . Acid fast bacteria and intracellular bacteria : (*Mycobacterium tuberculosis, Mycobacteriium leprae, Rickettsia and Chlamydia*)	

Sr. No.	SECTION II	Sessions Allotted 28
4	**Viral diseases:** Morphology, pathogenesis, immune response, diagnosis and prevention of Pox viruses (small pox, variola, vaccinia), Herpes simplex Type I, II, Picorna viruses (enteroviruses and polio viruses), Paramyxo viruses (rubula viruses, para influenza viuses, orthomyxo viruses (measles and mumps viruses), Hepatitis viruses (Type A,B,C,D,E), Arboviruse (alpha viruses and flavi viruses), Rhabdo viruses (rabies virus), Oncogenic viruses, HIV, EVD	
5	**Fungal diseases:** Route of entry, life cycle, immunity, diagnosis and prophylaxis of infections produced by: Dermatophytes (*Microsporum, Trichophyton and Epidermatophyton*), *Aspergillus, Candida, Histoplasma.* **Protozoan diseases:** Route of entry, life cycle, immunity, diagnosis and prophylaxis of infections produced by: *Plasmodium vivex, P.falciparum, P.malariae, Entamoeba histolytica, Entamoeba coli, Leishmania, Trypanosoma and Toxoplasma*. **Vector borne diseases:** Mosquitoes; Aedes, Anopheles, Culex. Sandflies. Ticks. Triatomine bugs, Tsetse flies, Fleas, Black flies, Aquatic snails	

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, black board, Audio/Video clips etc relevant to the content.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Minimum ten experiments shall be there in the laboratory related to course contents.

Students Learning Outcomes:

At the end of the course the students will be able to:

- Develop a thorough understanding of the major groups of infectious microorganisms, molecular mechanisms of pathogenesis, and drug resistance.
- This course will equip them for work in the field of medical microbiology.

Reference books:

1. Prescott`s Microbiology. Lansing M Prescott, John P Harley, Donald A Klein, 9th Edition, MacGraw Hill Higher education.

2. Microbiology: an introduction. Tortora G.J., Funke BR. 9th edition. Pearson education.
3. Microbiology. Pelczar M.J. Chan ECS. 5th edition. Tata MacGraw Hill publishing company limited.
4. General Microbiology. Stanier Roger, Ingraham John, Wheelis Mark. Painter Page. 5th Edition. Macmillan Press, London.
5. Medical Microbiology. Jawetz, Melnic and Adelberg's 5th edition, MacGraw Hill publishing company limited.
6. Virology. Renato Dulbecco and Harold S. Ginsberg, 4th edition. L.B. Lippincott company, USA.
7. Principles of Microbiology. Atlas, R. M., 3rd Edition, W. C. Brown Pub., 2001.
8. Medical Microbiology. Greenwood D, Slack R, Peutherer J, 15th edition. Churchil and Livinstone. 2007

RK.UNIVERSITY	SYLLABUS
Course Title	**BODY FLUID AND FECES**
Course Code	**DML213**
Course Credit	Lecture : 4
	Practical : 0
	Tutorial : 0
	Total : 4

DETAILED SYLLABUS		
Sr. No.	**BODY FLUID AND FECES** **SECTION I**	**Sessions Allotted 28**
1	**Body fluids and its Routine examination:** Introduction, Chemical- glucose , protein and chlorides, physical and microscopical examination-Preparation & staining of smear of Cerebrospinal fluid (CSF), Cell count and Cell Type of Preservation and Transport	
2	**URINE ANALYSIS:** Introduction, Examination of Urine – Formation of urine Physical examination – Colour, transparency, pH and Sp gravity. Chemical examination - Protein, Sugar, Ketone bodies, Bile pigment/salt, Chyle, Blood. Microscopical examination – Cells (RBC, WBC, Epithelial), casts, crystals, Detection of microalbumin & 24 hours urine protein estimation.	
3	**SPUTUM EXAMINATION: Introduction, chemical composition,** physical examination- quantity, colour, consistency, odor, layer formation and microscopical examination, Interpretative report format,, clinical condition- i.e. bronchiectasis, chronic bronchitis, lung abscess, pneumoconiosis, pneumonia, pulmonary embolism, heart disease, bronchomoniliasis, asthma	
Sr. No.	**SECTION II**	**Sessions Allotted 28**
4	**SEMEN ANALYSIS:** Introduction, brief anatomy of the male reproductive tract, morphology of spermatozoa, semen analysis- physical, Chemical, microscopical and microbiological examination, quantitative determination of fructose, Interpretative semen analysis.	

5	**FECES EXAMINATION:** Introduction, Gross and physical examination- Consistency, color, mucus, blood, parts of parasite, adult parasite. Chemical examination – pH and occult blood, microscopical examination- Protozoans, crystals, yeast cells, bacteria, erythrocytes, pus cells, vegetable matters, animal matters.

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, black board, Audio/Video clips etc relevant to the content.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Minimum ten experiments shall be there in the laboratory related to course contents.

Students Learning Outcomes:

At the end of the course the students will be able to:

- They will be well-versed with handling the infectious sample and their analysis
- Develop understanding about body fluids, associated disease and their clinical significance.
- They can able to give interpretation of the clinical findings and its report formation.

Reference books:

1. Textbook of Medical Laboratory Technology Vol 1 & 2, P.B Godkar, 3rd edition, Bhalani Publishing House,2005.
2. Medical Microbiology. Greenwood D, Slack R, Peutherer J, 15th edition. Churchil and Livinstone. 2007
3. Intestinal helminths of man: interpretation of egg counts. Parasitology Hall A,85(3). 605-613, 1982.
4. A color atlas of tropical medicine and parasitology,Peter W and Gilles HM, 3rd edition, Wolfe, 1989.

RK.UNIVERSITY	SYLLABUS
Course Title	**IMMUNOLOGY**
Course Code	**DML204**
Course Credit	Lecture : 4
	Practical : 0
	Tutorial : 0
	Total : 4

DETAILED SYLLABUS

Sr. No.	IMMUNOLOGY SECTION I	Sessions Allotted 28
1	**Introduction:** Definition of Infection, Immunity, origin of immune cell , Types of Antigen & Antibody (Complete and incomplete antibody), Types of Antigen-Antibody reaction, Detection of Antigen-Antibody Reactions (ELISA, RIA).	
2	Diagnostic serological methods for microbial disease– Agglutination & Flocculation, Latex agglutination tests – ELISA testing & RIA – principles, clinical significance, demonstration and interpretation of results of - Widal Test (slide and tube), VDRL Test (qualitative and quantitative), Aldehyde Test, ASO Titre (qualitative and quantitative) , Rheumatoid factor, C-reactive protein, HBsAg, Anti HCV, immunological Pregnancy Test, detection of antibodies associated with systemic lupus erythematosus (SLE), Qualitative and quantitative determination of regine antibodies (syphilis RPR)	
Sr. No.	**SECTION II**	**Sessions Allotted 28**
3	Detection of Dengue fever IgM and IgG by ELISA, secondary dengue infection dengue IgG capture ELISA test, Qualitative detection of IgG antibodies to *Helicobacter pyroli,* Detection of *Mycobacterium tuberculosis* IgG, IgA and IgM antibodies. Hypersensitivity- classification & different skin tests used for diagnosis, Immunodeficiency diseases including AIDS – in brief, HIV test, Autoimmunity – Basic concept, Immunoprophylaxis & Immunization schedule, different Vaccines-classification & uses. Autoimmune disease, haemolytic disease of newborn.	

4	Get diffusion techniques and Immunoelectrophoresis- Principle, preparation, use and handling, advantages and limitation.
5	**Antimicrobial chemotherapy:** The development of chemotherapy, general characteristics of antimicrobial drugs, determining the level of antimicrobial activity, drug resistance. Mode of action of various antibiotics, antibiotic misuse and drug resistance, antibacterial drugs, antifungal drugs, antiviral drugs, antiprotozoan drugs. Clinical diagnosis of diseases and advancement in diagnostic techniques.

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, black board, Audio/Video clips etc relevant to the content.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Minimum ten experiments shall be there in the laboratory related to course contents.

Students Learning Outcomes:

At the end of the course the students will be able to:

- Develop understanding about different immunological techniques
- Understand the immunological response of human body to different diseases.
- Develop skills to handle some sophisticated instruments and interpretation of results.

Reference books:

1. Prescott`s Microbiology. Lansing M Prescott, John P Harley, Donald A Klein, 9th Edition, MacGraw Hill Higher education.
2. Microbiology. Pelczar M.J. Chan ECS. 5th edition. Tata MacGraw Hill publishing company limited.
3. Medical Microbiology. Jawetz, Melnic and Adelberg's 5th edition, MacGraw Hill publishing company limited.
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