Syllabus Book

1st to 2nd Semester

PG Diploma in Medical Lab Technology

P P Savani University

School of Sciences

Effective From: July, 2021

Semester-1

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Essentials in Clinical Biochemistry
Course Code:	SSPD7010
Prerequisite:	B.Sc. Life Sciences

Teaching and Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
2	0	0	2	40	60	100

CE: Continuous Evaluation, ESE: End Semester Examination

Objective(s) of the Course:

Students will acquire basic and fundamental knowledge of Bio-molecules, biochemistry,

Course Contents:

Section-I

Module	Content	Hours	Weightage (%)
1	**Introduction & General aspects** • Definition and scope of clinical biochemistry in diagnosis. • Collection and preservation of biological fluids (blood, urine & CSF) • Normal values of important constituents of blood, CSF and urine. • Different anticoagulants used in Clinical Biochemistry, its application and Mechanism of action. • Safety measures in clinical laboratory.	6	25
2	**Metabolism of Carbohydrate, Lipids, and Proteins** • Major metabolic pathways and its impontance.	8	25

	• Diabetes mellitus, GTT, Glycated -Hemoglobin • Glycogen storage diseases. • Beta oxidation, Ketogenesis, Ketosis, Adipose tissue • Clinical inter-relationships of lipids, Atherosclerosis, fatty liver • In born errors of amino acid metabolism **Disorders of nucleic acid metabolism- Disorders in purine/pyrimidine metabolism.**		
Section-II			
3	**Electrolytes:** • Function, Properties, Estimation of Essential electrolytes: Sodium, potassium, calcium, chloride and Phosphorus etc. • Disorders of acid-base balance and their respiratory and renal mechanisms. **Diagnostic enzymes:** • Definition, Classification, Factors affecting enzyme activity, Diagnostic use of Enzyme **Function Test:** **Liver Function tests:** Introduction, function of liver, type of investigations carried out, normal range and interpretation of results, Clinical importance of bilirubin. **Renal function tests:** Functions of kidneys, Various renal function tests including clearance tests and interpretation of results. **Thyroid function tests:** Estimation of T-3, T-4, TSH, Interpretation of results. Interpretation of results. pH, Blood buffers, Acid-base balance, Anionic gap.	8	25
4	**Minerals:** Calcium, Iron, Phosphorus, Iodine, Sodium & Potassium. **Vitamins (In brief):**	8	25

	A, D, E, K, B12,Folic acid & Vitamin C (In brief) **Nutrition**: Principles of nutrition, Balance diet, BMR. Kwashiorkor and marasmus **Molecular biology:** Molecular biology (In brief): Replication, transcription, DNA recombinant technology, Blot techniques, PCR		

Course Outcomes:

CO1: Students will learn the basic concepts of the biochemistry laboratory, testing, safety, sample collection, criteria, etc.

CO2: Students will be able to understand the various biochemical tests & their relationship to biochemical variations of pathological conditions. Students will understand the classification, and functions of human enzymes and normal and abnormal levels.

CO3: By the end of this topic students will be able to know how to determine and examine sugar in serum. also know the normal value of sugar in the blood.

CO4: Upon completion of this topic students will evaluate the various tests for organ function in serum. And also understand the normal and abnormal values in serum.

CO5: Students will learn about the molecular biology.

Reference Books:

Title	Authors	Publisher
Clinical diagnosis and management by laboratory methods.	Henry, John Bernard, Todd Sanford and Davidson	W.B. Saunders & Co.
Medical Laboratory methods and interpretation	Sood, R	Jaypee brothers medical publications, New Delhi.
Biochemistry	U. S. Satyanarayana	Elsevier Publications
Text book of Medical Laboratory Technology	Praful B Godkar, Darshan P Godkar	Bhalani Publishing House
Lehninger Principles of Biochemistry 4th	David L. Nelson and Michael M. Cox	WH Freeman and Company.
Principles of Biochemistry	Geoffrey Zubay	McGraw Hill Publications

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Medical Microbiology					
Course Code:	SSPD7050					
Prerequisite:	B.Sc. Life Sciences					
Teaching and Examination Scheme:						
Teaching Scheme (Hours/Week)				**Examination Scheme (Marks)**		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
2	0	0	2	40	60	100
CE: Continuous Evaluation, ESE: End Semester Examination						
Objective(s) of the Course:						
• The students will acquire the fundamental and basic knowledge about pathogenic organisms, microbial infections, nosocomial infections, immune system, functions vaccination, pathogenesis, signs, symptoms and treatment of various diseases. • To inculcate habit of scientific reasoning, to do the task rationally.						
Course Contents:						

Section-I

Module	**Content**	**Hours**	**Weightage (%)**
1	**General Microbiology** • History and Pioneers in Microbiology: Contributions of Antony Van Leeuwenhoek, Louis Pasteur, Joseph Lister, Robert Koch (Koch's Postulates) • Bacterial Taxonomy: Nomenclature and classification of microbes (in brief) • Microscope: Light microscope and Electron microscope, Bright field microscopy, Dark field microscopy, fluorescence microscopy, Phase Contrast microscopy, Electron microscopy.	6	25

Course Name:	Medical Microbiology		
	• Staining of Bacteria: Composition, Preparation, Principle, and Procedure of Various Staining techniques: Simple staining,. Gram staining, Acid fast staining, Metachromatic granules staining, Negative staining, Spirochete staining, Capsule staining, Spore staining		
2	**Media for Bacterial Growth** • Types of Liquid, Solid, Semi-solid media, Basal media, Defined media, Complex media, Enriched media, Enrichment media. Transport media, Differential/ Indicator media, Anaerobic media. • **Culture Techniques:** Isolation of bacteria in pure culture, methods of culture & inoculation, streak culture, lawn or carpet culture, liquid culture, stroke culture, stab culture, description of colonies of bacteria. • Antibiotic sensitivity test(AST). • **Sterilization and Disinfectant:** Introduction of Various Terms: Sterilization, Disinfection and Disinfectant, Antiseptic, sanitizer, Germicide, Bactericide, Bacteriostasis, Sepsis, Asepsis and Antimicrobial agent. • **Factors affecting sterilization and disinfection:** Sterilization Methods- Physical and Chemical Methods • Characteristic of ideal disinfectant. • Major group of chemical agents as disinfectants	8	25
	Section-II		
3	**Bacteriology:** • Classification, antigenic structure, pathogenicity, diseases caused, isolation, characterization-Morphology, cultivation and laboratory diagnosis including specimen, Identification and biochemical characterization collection of the following	8	25

Course Name:	Medical Microbiology		
	B**acteria:** *Staphylococcus, Streptococcus, Bacillus, Salmonella, Proteus, Escherichia, Pseudomonas, Klebsiella, Neisseria, Vibrio Mycobacterium, Clostridium, Corynebacterium, Spirochaetes.*		
4	**Fungal Infections:** • Introduction and Lab diagnosis of fungal Infections • *Dermatophytes,* • *Histoplasma,* • *Cryptococcus,* • *Candida,* • *Aspergillus.* **Clinical /Applied microbiology:** Bio medical wast disposal, Infection Control, Needle strict injury, Hospital Acquired Infection, Automation in Diagnostic Microbiology.	8	25

Course Outcomes:

CO1: Students will be able to classify the Microorganisms based on their morphology.

CO2: Students will be able to define the types of culture media and their preparation methods. Students will also know the quality standard procedure to avoid contamination of culture media.

CO3: Students will be able to know the definition of sterilization, the principle, and the types of sterilization and disinfection.

CO4: Students will understand the role of disease-causing & their laboratory diagnosis as well as general morphology, culture characteristics, and classification.

CO5: Students will be able to understand the role of fungus disease and their laboratory diagnosis as well as general morphology, culture characteristics, and classification.

Reference Books:

Title	Authors	Publisher
Microbiology: An Introduction, Eighth Edition By..	Gerard J. Tortora, Berdell R. Funke, Christine L. Case	Pearson Education
Microbiology: Concepts and Applications	By MJ Pelczar, ECS Chan and NR Krieg,	McGraw-Hill

Course Name:	Medical Microbiology	
Principles of Microbiology By	Ronald M. Atlas	Taylor and Francis
Text book of Medical Mycology	Jagdish Chander	Jaypee Publications

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Clinical Pathology and Histopathology
Course Code:	SSPD7090
Prerequisite:	B.Sc. Life Sciences

Teaching and Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
2	0	0	2	40	60	100

CE: Continuous Evaluation, ESE: End Semester Examination

Objective(s) of the Course:

To introduce the students with the field of Clinical Pathology

To make student aware about various types of Pathology Tests.

To prepare the student for Pathology lab practices and handling of various clinical specimens.

Course Contents:

Section-I CLINICAL PATHOLOGY

Module	Content	Hours	Weightage(%)
1	**Urine Analysis:** Collection, Preservation & Transportation of Urine, Routine Examination Physical, Chemical & Microscopic, Correlation of urinary findings in various diseases **Stool Analysis:** Collection, Preservation & Transportation of Stool, Routine Examination Physical, Chemical & Microscopic, Correlation and significance in various diseases. **Semen Analysis:** Physical, Chemical & Microscopic Examination as per WHO	8	25

	Recommendation. Medico – legal significance of Semen examination		
2	**Cerebrospinal Fluid:** Collection, Preservation & Transportation of C.S.F. Composition of CSF, Physical, Chemical &Microscopic Examination Correlation of Abnormal C.S.F. findings in various diseases **Examination of Body Fluids:** Transudate & Exudate, Effusion, Indications, Collection and Examination-Physical, Chemical & Microscopic of following body Fluids. i)Pleural, ii)Peritoneal, iii)Pericardial iv)Synovial fluid.	8	25
Section-II HISTOPATHOLOGY AND CYTOPATHOLOGY TECHNIQUES			
3	• Introduction and Instrumentation, Museum- Technique & Specimen preservation • Handling Biopsy Specimen • Fixation & common fixatives • Tissue processing: dehydration, clearing, embedding, methods of tissue processing: automated & manual, Preparation ob block. • The manipulation and use of microtomes, Microtom knives and methods of sharpening. Paraffin block, section cutting, picking up sections, drying sections, • Staining: principle of staining, preparation and use of Hematoxyline and eosin stain & Mounting, • Frozen section apparatus: a theoretical knowledge of its application, construction and use. • Special Stain used in Histopathology • Automation in Histopathology.	8	25
Course Outcomes:			

CO1: Students will be able to identify urine specimens and understand the normal and abnormal characteristics of urine, urine specific gravity, normal color, and urine-related infections.

CO2: Students will be able to understand the examination of stool, such as its normal color, thickness, and consistency. They will also know the examination procedures such as microscopy, staining of the smear, and smear preparation.

CO3: Students will understand the various body fluids their properties and normal and abnormal values., also understand the procedure of the examination.

CO4: Learners will be able to understand the definition of semen, basic properties and the process of laboratory.

CO5: Students will learn routine laboratory procedures in histopathology and cytology (documentation, staining, preparation, sample received/rejection) and techniques for diagnosis.

Reference Books:

Title	Authors	Publisher
Textbook of Medical Technology	Godkar	Bhalani Publications
Basic and Advanced Laboratory Techniques in Histopathology and Cytology	Dey, Pranab	Springer
Histology Lab Manual	Kulkarni and Ranjan	Jaykarna Publications
Histopathology Specimens	Dereck Allen	Springer
Diagnostic Cytology	Pranab De	Jaypee Brothers Publications

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Concept of Hematology and Blood Banking
Course Code:	SSPD7130
Prerequisite:	B.Sc. Life Sciences

Teaching and Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
2	0	0	2	40	60	100

CE: Continuous Evaluation, ESE: End Semester Examination

Objective(s) of the Course:

- The students will acquire the fundamental and basic knowledge about blood, blood grouping, hematology, sample collection, preservation, documentation, various blood test, diagnosis and treatment.
- To inculcate habit of scientific reasoning, to do the task rationally

Course Contents:

Section-I HEMATOLOGY

Module	Content	Hours	Weightage (%)
1	**Blood & Hematological Test:** Formation of Blood cells, Composition of blood cellular elements, functions of blood. Collection of Blood samples for Hematological studies, Types of Anticoagulants, Storage of Samples, Hemoglobin and its estimation, Red blood cell count, White blood cell count, Platelet count, counting fluids preparation, Reticulocytes, Study of Peripheral smear, Staining procedures, Differential WBC count, Romanowasky stains, PCV & Blood Indices, Erythrocyte sedimentation rate, Basics of Automated Blood Cell counters	8	25

Course Name:	Concept of Hematology and Blood Banking		
2	**Anemia:** Definition & Classification of Anemia, Iron & B-12 deficiency anemia, egaloblastic anemia, Aplastic anemia, Hemolytic anemia / Sideroblastic anemia, R.B.C. Metabolism, G-6PD deficiency anemia. **Hemoglobinopathies:** Structure of Hemoglobin Molecule, Types of normal Hemoglobin, Abnormalities of Hemoglobin Molecule, Sickle Cell Anemia, Thalassemia, Tests for Hemoglobinopathies: 1. Screening test (i)Sickling test (ii) NESTROF 2. Confirmatory test (i) Electrophoresis (ii)HPLC **Blood Coagulation:** Mechanism of Blood Coagulation, Bleeding time/ Clotting time/ Clot Retraction, Thrombin time/ Prothrombin time, Coagulation disorders, Haemophilia A & Haemophilia B, Platelet disorders	8	25
Section-II BLOOD BANKING			
3	**Blood Group System:** ABO blood Group system, subgroup of ABO, Variants of ABO blood group system, Rh blood group system, Serological techniques for detection of ABO & Rh antigens, Gel technique for blood grouping and serological Techniques, AHG test, Other Blood Group systems	6	25
4	Screening of Donor, Blood Collection, Storage and transportation of blood, Component preparation: Red cell concentrate**,** Washed red cells**,** FFP**,** Cryoprecipitate, Platelet concentrate **Compatibility testing:** Compatibility testing and special methods of routine and emergency cross match, Trouble shooting in	8	25

	grouping and cross matching **Transfusion reaction:** Types of Transfusion reaction, Investigation of Transfusion reaction. **Hemolytic disease of new born:** Hemolytic disease of the New born due to ABO incompatibility, Rh incompatibility, Other blood group incompatibility.		

Course Outcomes:

CO1: Students have in-depth knowledge of the composition of blood and the type of anticoagulant and identify the blood smear.

CO2: Students will get to know the decreasing condition of blood and Hb and identify the cell in the blood smear.

CO3: Students will learn the different types of hemoglobin, and estimation methods available for cell counting and interpretations.

CO4: Students will learn about the discovery of the blood group system various techniques and other important aspects of Blood banking.

CO5: In this topic, students will be able to know the donor screening process and also know the types of donors.

Reference Books:

Title	Authors	Publisher
Clinical Haematology.	M.M. Wintrobe	Kothari's Indian Edition
Practical Haematology.	J.A.Dacei & S.M. Lewis	The English Language Book Society.8th ed., ELBS
Handbook of Medical Laboratory Technology.	Bharucha, Meyerm,	Moody, Carman, Vellore.

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Essentials of Clinical Biochemistry- Practical
Course Code:	SSPD7030
Prerequisite:	B.Sc. Life Sciences

Teaching and Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
0	4	0	2	40	60	100

CE: Continuous Evaluation, ESE: End Semester Examination

Objective(s) of the Course:

To introduce the students with the field of Biochemistry.
To make student aware about various methods for blood collection, diseases of blood, clinical diagnosis, various techniques.

Course Contents:

Essentials of Clinical Biochemistry- Practical

Module	Content	Hours
1	Preparation of standard solution, molar solution and other reagents	4
2	Analysis of normal and abnormal urine	4
3	Estimation of total protein	4
4	Estimation of blood /serum glucose by various methods	8
5	Estimation of urea	4
6	Estimation of uric acid	4

7	Estimation of Creatinine	4
8	Estimation of Bilirubin, direct, total	8
9	Colorimeter	4
10	Chromatography	4
11	Spectrophotometer	4
12	Electrophoresis of plasma proteins	4
13	Electrophoresis of lipoproteins	4

Course Outcomes

CO1: Students will apply appropriate laboratory techniques, tests, instruments, and equipment in accordance with the current laboratory safety protocol.
CO2: Students will be able to prepare various reagents used in the laboratory.
CO3: Also learn about recording and reporting according to standard laboratory criteria.
CO4: Students gain knowledge about normal and abnormal urine tests.
CO5: Capable of safe and effective disposal of laboratory waste.

Reference Books:

Title	Authors	Publisher
Medical Laboratory Technology, 5th reprint 1999,Vol. I, II & III,	K.L.Mukharjee	TataMcGraw Hill
Text book of Medical Laboratory Technology	P.B.Godkar	Bhalani Publishing House, Mumbai
Biochemistry for Medical students	Vasudevan & Shreekumar	Jaypee Brothers Medical Publishers Pvt. Limited

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Medical Microbiology- Practical
Course Code:	SSPD7070
Prerequisite:	B.Sc. Life Sciences

Teaching and Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
0	4	0	2	40	60	100

CE: Continuous Evaluation, ESE: End Semester Examination

Objective(s) of the Course:

To introduce the students with the field of Microbiology
To make student aware about various methods for blood collection, diseases of blood, clinical diagnosis, various techniques

Course Contents:

Medical Microbiology -Practical

Module	Content	Hours
1	Microscopy (Theory and hands on Activity)	4
2	Operation of autoclave, hot air oven and distillation plan	4
3	Washing and sterilization of glassware (Plugging and packing)	4
4	Preparation and pouring of media and Different Culture Method	4
5	Disposal of contaminated materials and Hand Hygiene	4
6	Performance of antimicrobial susceptibility testing e.g. Kirby-Bauer	4
7	Collection and Transportation of Specimens	4
8	Identification of Bacteria- Biochemical tests	4
9	Staining Reaction: Gram Staining, Ziehl Neelsen (ZN) Staining	4

10	Tests for motility: hanging drop preparation	4
11	*Staphylococcus, Streptococci & Pneumococci,*	8
12	*Mycobacteria, Pseudomonas, Corynebacterium*	8
13	Lab diagnosis of fungal Infections.- *Candida, Aspergillus*	4

Course Outcomes:

CO1: Students will apply appropriate microbiology laboratory techniques, methodologies, instruments, and equipment in accordance with the current laboratory safety protocol.

CO2: Students will be able to the preparation of media.

CO3: Also learn about recording and reporting clinical microbiology results according to standard laboratory criteria.

CO4: Students will identify the different pathogens responsible for diseases.

Reference Books:

Title	Authors	Publisher
Medical Laboratory Technology,5th reprint 1999,Vol.I,II & III,	K.L. Mukharjee	Tata McGraw Hill
Text book of Medical Laboratory Technology	P.B.Godkar	Bhalani Publishing House, Mumbai

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Clinical Pathology and Histopathology - Practical
Course Code:	SSPD7110
Prerequisite:	B.Sc. Life Sciences

Teaching and Examination Scheme:

Teaching Scheme (Hours/Week)				**Examination Scheme (Marks)**		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
0	4	0	2	40	60	100

CE: Continuous Evaluation, ESE: End Semester Examination

Objective(s) of the Course:

- The students will acquire the fundamental and basic knowledge about clinical pathology and histopathology, about various tests various body fluids, various staining techniques, cytology and basic knowledge of clinics and testing.
- To inculcate habit of scientific reasoning, to do the task rationally

Course Contents:

Clinical Pathology & Histopathology- Practical

Module	**Content**	**Hours**
1	Physical Examination of Urine.	4
2	Chemical Examination of Urine.	8
3	Microscopic Examination of Urine	8
3	Stool Analysis: Physical, Chemical, Microscopic examination	4
4	Cerebrospinal Fluid: Physical, Chemical, Microscopic examination	4

5	Semen examination: Physical, Chemical, Microscopic examination	4
6	Introduction to Histopathology Equipment & Reagents	4
7	Fixation	4
8	Tissue Processing & Paraffin Embedding	4
9	Preparation of Paraffin Blocks	4
10	Section Cutting	4
11	Hematoxylin & Eosin Stain	4
12	PAP Stain & Mounting	8

Course Outcomes:

CO1: Students will learn appropriate specimens and tests necessary for diagnosis.

CO2: Students will Interpret and correlate clinical and laboratory data.

CO3: Also learn about recording and reports according to standard laboratory criteria. CO4: Students will correlate clinical and laboratory findings with pathology findings.

Reference Books:

Title	Authors	Publisher
Basic and Advanced Laboratory Techniques in Histopathology and Cytology	Dey, Pranab	Springer
Textbook of Medical Technology	Godkar	Bhalani Publications
Histology Lab Manual	Kulkarni and Ranjan	Jaykarna Publications
Histopathology Specimens	Dereck Allen	Springer
Diagnostic Cytology	Pranab De	Jaypee Brothers Publications

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Concepts of Hematology and Blood Banking - Practical					
Course Code:	SSPD7150					
Prerequisite:	B.Sc. Life Sciences					
Teaching and Examination Scheme:						
Teaching Scheme (Hours/Week)				**Examination Scheme (Marks)**		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
0	4	0	2	40	60	100
CE: Continuous Evaluation, ESE: End Semester Examination						
Objective(s) of the Course:						
To introduce the students with the field of Hematology and blood bank.						
To make student aware about various methods for blood collection, diseases of blood, clinical diagnosis, various techniques.						
Course Contents:						

Concepts of Hematology and Blood Banking - Practical

Module	**Content**	**Hours**
1	Methods of Blood Collection and Anticoagulants	4
2	Hemoglobin estimation: Sahli's method and Cyanmethemoglobin method.	4
3	Total R.B.C.	4
4	Total W.B.C. Count	4
5	Differential Count.	4
6	Platelet Count (Demo)	4

7	ESR, Packed cell volume/ Determination of Haematocrit	8
8	Bleeding time, Whole Blood Coagulation time and Prothrombin time	8
9	Preparation of various stains & reagents for hematology test	4
10	ABO and Rh blood grouping	4
11	Anti D titration by albumin and indirect antiglobulin technique	4
12	Cross matching procedures.	4
13	Direct Antiglobulin (Coomb's) Test & Indirect Antiglobulin test.	4

Course Outcomes:

CO1: Students will Perform and interpret commonly utilized procedures in the Hematology and blood bank laboratory.

CO2: Students will Recognize normal and abnormal test results and correlate these data with appropriate pathological conditions to accurately advise health care providers.

CO3: students will learn advanced hematology, blood bank, and blood transfusion knowledge to make appropriate and effective on-the-job professional decisions.

Reference Books:

Title	Authors	Publisher
Medical Laboratory Technology,5th reprint 1999,Vol.I,II & III,	K.L.Mukharjee	TataMcGraw Hill
Text book of Medical Laboratory Technology.	P.B.Godkar	Bhalani Publishing House, Mumbai
Practical Haematology. J. A. Dacie& S. M. Lewis	J. A. Dacie& S. M. Lewis,	The English Language Book Society, 8th ed., ElBS
Collection and Handling of Laboratory Specimen – A Practical Guide, 1983	Editor T. M. Slockbower& T.A. Bhumenfeld, J. B	Lippincott company, USA

Semester-2

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Fundamentals of Immunology
Course Code:	SSPD7020
Prerequisite:	B.Sc. Life Sciences

Teaching and Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
2	0	0	2	40	60	100

CE: Continuous Evaluation, ESE: End Semester Examination

Objective(s) of the Course:

Students will acquire basic knowledge of immunology with special consideration to the importance of the immune system

Course Contents:

Section-I			
Module	**Content**	**Hours**	**Weightage (%)**
1	Infection Sources of infection Modes of transmission Factors predisposing to microbial pathogenicity Types of infectious diseases	6	25
2	Immunology Immunity Antigen Antibody, Antigen-Antibody reactions : General features: Precipitation, Agglutination,	8	25
Section-II			
3	Complement fixation test,	8	25

	Immunofluorescence, Radio Immunoassay, ELISA, Complement system, Hypersensitivity: Classification and Immunological basis		
4	Structure and function of Immune system Organ and cells of immune system Major Histocompatibility Complex Immune Response Humoral Immune response Primary & secondary immune response Cellular Immune Response: Scope of CMI, Induction of CMI, Cytokines Immunoprophylaxis: Types of vaccines and schedule of vaccination.	8	25

Course Outcomes:

CO1: Students will know the basic features of Ag-Ab reaction and its heir functions. They will understand the types of reactions. At the end of this topic, students will be able to know the principle of Ag-Ab reaction and how to interpretation the results.

CO2: Students will be able to know the basic concept of infection, types of infection, mode of transmission, etc.

CO3: At the end of this topic, students will learn about the different types of ELISA and their principle and procedures.

CO4: Tue students will be able to understand the role of immunity and the detail about the types and immune responses, etc

Reference Books:

Title	Authors	Publisher
Text Books of Medical Laboratory Technology	Dr. Praful B. Godkar	Bhalani Publishing House
Text Book of Medical Microbiology	Anathanarayana & Panikar	The orient Blackswan:10 th edition
Prescott, Harly and klein's Microbiology	Linda Sherwood, Christopher J. Woolverton, Joanne Willey	McGraw-Hill Higher Education, 2008

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Virology and Parasitology
Course Code:	SSPD7060
Prerequisite:	B.Sc. Life Sciences

Teaching and Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
2	0	0	2	40	60	100

CE: Continuous Evaluation, ESE: End Semester Examination

Objective(s) of the Course:

The students will acquire the fundamental and basic knowledge regarding the diagnostics clinical aspects and related implications of human viral disease and parasitic infection, also newer emerging viral infections including the viral mutan forms for emerging.

Course Contents:

Section-I

Module	Content	Hours	Weightage (%)
1	The Nature and classification of viruses Morphology: virus structure and Virus replication, The genetics of viruses, The pathogenicity of viruses Bacteriophage	6	25
2	General Properties of Virus: Morphology, Laboratory diagnosis & prevention of • DNA Virus- Hepatitis, Adeno • RNA Virus- Orthomyxo- Parainfluenza virus	8	25

Course Name:	Virology and Parasitology		
	• Piorna virus- Polio Virus • Pox Virus- Small Pox Virus • Retro Virus- HIV Virus • Corona Virus • Viral Vaccines and antiviral agents		
	Section-II		
3	Morphology, life cycle, laboratory diagnosis of following parasites: Protozoa: *Entamoeba,* *Giardia,* *Trichomonas,* *Leishmania,* *Trypanosoma,* *Plasmodium,* *Toxoplasma,*	8	25
4	**Helminthology** **Cestodes:** *Taenia* *Echinococcus* **Nematodes:** *Trichuris* *Ancylostoma,* *Ascaris,* *Enterobius,* *Wuchereria bancrofti(filaria)*	8	25
Course Outcomes: CO1: Students will be able to learn the role of parasitic disease causing & their laboratory diagnosis as well as the general morphology, culture characteristics, and classification of parasites/Virus. CO2: Students will be able to understand sample handling, transportation & laboratory processes of			

Course Name:	Virology and Parasitology

specimens for disease diagnosis of disease. Students will also be aware the how to collect different types of specimens in sterilized conditions in various bottles and tubes.

CO3: Students will have a proper understanding of the different types of viruses their morphology, life cycle, and laboratory diagnosis. As well as serology methods available for the detection of infection.

CO4: Students will learn the different types of parasites that can cause diseases, and their morphology, life cycle, and laboratory diagnosis to diagnose the intestinal parasitic infections.

Reference Books:

Title	**Authors**	**Publisher**
Reference Books:		
Text book of Microbiology	Anathanarayana & Panikar	The orient Blackswan:10 th edition
Text Books of Medical Laboratory Technology	Dr. Praful B. Godkar	Bhalani Publishing House
Parasitology	K.D Chatterjee	CBS 13th edition
District Laboratory Practice in Tropical countries	Monica Cheesbrough	Cambridge University press 2nd edition.

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Anatomy and Physiology
Course Code:	SSPD7100
Prerequisite:	B.Sc. Life Sciences

Teaching and Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
2	0	0	2	40	60	100

CE: Continuous Evaluation, ESE: End Semester Examination

Objective(s) of the Course:

The students will acquire the basic knowledge about provide basic knowledge about the human body. It helps in clearing the fundamental concepts as to how our bodies function.

Course Contents:

Section-I Anatomy

Module	Content	Hours	Weightage (%)
1	**Introduction of Bones, and Joint of the Human Body of:** Cartilage – types with example Bone – Classification, names of bone cells, parts of long bone, microscopy of compact bone, names of all bones, vertebral column, inter vertebral disc, fontanelles of fetal skull Joints – Classification of joints with examples, synovial joint (in detail for radiology) Names of muscles of the body **Cardiovascular system:** Heart-size, location, chambers, exterior & interior, Blood supply of heart, Systemic & pulmonary circulation.	8	25
2	**Gastrointestinal system:** Parts of GIT, Oral cavity, tonsil,	8	25

	dentition, pharynx, salivary glands, Waldeyer's ring, Oesophagus, stomach, small and large intestine, liver, gall bladder, pancreas **Respiratory system:** Parts of RS, nose, nasal cavity, larynx, trachea, lungs, **Urinary system:** Kidney, ureter, urinary bladder, male and female urethra **Introduction &** Anatomical Position of Gal bladder, Spleen		
Section-II Physiology			
3	**Physiology** Composition and Function: Blood Formation of different type of blood cells: Erythrocytes Leukocytes Thrombocytes Mechanism of Blood Clotting	8	25
4	Heart rate and sound Blood pressure Mechanism of breathing Function of Kidney Regulation of acid-base balance	6	25

Course Outcomes:

CO1: Students will understand the definition of anatomy and physiology and their various terms.
CO2: Students know the structure of the cell and its constituents.
CO3: Students will learn the anatomical structure, their parts, and their functions.
CO4: Students will get knowledge about systems of anatomical and physiological characters.

Reference Books:

Title	Authors	Publisher
Understanding Human, Anatomy and	William Davis (P)	MC Graw Hill

Physiology		
Human Anatomy for Nursing & Allied Sciences	Dr. M.K.Anand, Dr. Meena Verma	The Arora Medical Publishers Pvt.Ltd , - 1st edition
Text Book of Physiology	Guyton (Arthur)	Latest Ed. Prism publishers
Review of Medical Physiology	Ganong (William F)	Latest Ed . Appleton

Course Name:	Management of Laboratory and Quality Control
Course Code:	SSPD7140
Prerequisite:	B.Sc. Life Sciences

Teaching and Examination Scheme:

Teaching Scheme (Hours/Week)				**Examination Scheme (Marks)**		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
2	0	0	2	40	60	100

CE: Continuous Evaluation, ESE: End Semester Examination

Objective(s) of the Course:

The students will acquire the important impacts on laboratory testing, ensures both precision and accuracy of patient sample results. The integrity of quality control samples is important to both management of overall quality as well as to meeting requirements of proficiency testing.

Course Contents:

Section-I

Module	**Content**	**Hours**	**Weightage (%)**
1	**Health laboratories management:** Definition and Principles Role of Laboratory in Health Care and Training of Laboratory	8	25

	Personnel Code of Conduct **Laboratory organization:** Introduction Organization of Health Laboratory Service Structure and Function of Laboratory Service Safe Laboratory Design		
2	**Laboratory Policies:** Definition and Purpose Applications of computer in different laboratories Laboratory Hours and Emergency Work Range of Tests to be Performed and Referral of Specimens Work Load Capacity of the Laboratory Collection of Specimens Delivery of Reports, Reporting Results and Record Keeping	8	25
	Section-II		
3	**Management of laboratories resources:** Management of Time and Space Management of Equipment and Supplies **Safety in the Laboratories:** Importance of Safety Source of Laboratory Hazards Safety Measures Preventing Laboratory Infection Elements of Laboratory Safety Program	6	25
4	**Quality Assurance:** Introduction Definition and Purposes of QA Components of Quality Assurance **Quality Control:** Definition Types of QC Assessing Value of Tests	8	25
Course Outcomes:			

CO1: Students will be able to know the purpose, Work, various workloads, laboratory details, as well as application of computers in laboratories.

CO2: Students will understand the different policies, criteria, laboratory setup, etc.

CO3: Students will learn about time, management, safety, infection prevention, equipment work and handling etc.

CO4: Students know the task of quality management task, be aware of components of quality assurance, types of QC, etc

Reference Books:

Title	Authors	Publisher
An Introduction to medical laboratory technology	F J Baker, R E Silverton, Evaline D. Luckcock	Butterworth-heinemann
District Laboratory Practice in Tropical countries	Monica Cheesbrough	Cambridge University press 2nd edition.

Course Name:	Fundamentals of Immunology - Practical
Course Code:	SSPD7040
Prerequisite:	B.Sc. Life Sciences

Teaching and Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
0	4	0	2	40	60	100

CE: Continuous Evaluation, ESE: End Semester Examination

Objective(s) of the Course:

To introduce the students with the field of Immunology.

To make student aware about various techniques, and interpretation for test and result.

Course Contents:

Fundamentals of Immunology - Practical

Module	Content	Hours
1	Collection of blood by venipuncture, separation of serum and preservation of serum for short and long periods.	6
2	Agglutination: Slide/Tube agglutination : Widal test and Interpretation	6
3	Latex agglutination: ASO Test	6
4	Latex agglutination: RA Test	6
5	Latex agglutination: CRP Test	6
6	Slide flocculation: VDRL test Or RPR test	6
7	Enzyme linked Immunosorbant assay (ELISA): HIV micro ELISA & Spot ELISA	6
8	Immunochromatography (ICT): ICT-HBsAg test	6
9	Rapid Flow–through Immunoassay: Rapid HIV test and Interpretation	6
10	Rapid Flow–through Immunoassay: Rapid HCV test and Interpretation	6

Course Outcomes:

CO1: Students will Perform and interpret various test results like ASO, WIDAl, RA, CRP, etc.

CO2: Students will Recognize normal and abnormal test results and correlate these data.

CO3: students will learn different methods use in immunology.

Reference Books:

Title	Authors	Publisher

District Laboratory Practice in Tropical countries	Monica Cheesbrough	Cambridge University press 2nd edition.
Text Books of Medical Laboratory Technology	Dr. Praful B. Godkar	Bhalani Publishing House
Practical Medical Microbiology	Mackey & Mac Cartney	Elsevier; 14th edition

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Parasitology - Practical
Course Code:	SSPD7080
Prerequisite:	B.Sc. Life Sciences

Teaching and Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
0	4	0	2	40	60	100

CE: Continuous Evaluation, ESE: End Semester Examination

Objective(s) of the Course:

To introduce the students with the field of Parasitology.

To make student aware about various techniques, different methods and identification of Parasites.

Course Contents:

Parasitology - Practical

Module	Content	Hours
1	Stool examination for parasitic eggs/cysts: Saline mount	6
2	Stool examination for parasitic eggs/cysts: Iodine mount	6
3	Concentration methods	6
4	Examination of blood for protozoa and helminths by wet mount	6
5	Examination of blood for protozoa and helminths by thin and thick stained smears	6
6	Identification of Cestodes: *Taenia, Echinococcus*	6
7	Identification of Nematodes: *Trichuris, Ancylostoma, Ascaris,*	6
8	Identification of Nematodes: *Enterobius, Wuchereria bancrofti(filaria)*	6

9	Performance of stains – Leishman, Giemsa.	6
10	Performance of stains – Giemsa.	6

Course Outcomes:

CO1: Students will Perform different methods available for the identification of parasites.

CO2: Students will identify the parasitic form(eggs, cysts, protozoa, etc..)

CO3: students will perform different stains for the identification of parasites.

Reference Books:

Title	Authors	Publisher
District Laboratory Practice in Tropical countries	Monica Cheesbrough	Cambridge University press 2nd edition.
Text Books of Medical Laboratory Technology	Dr. Praful B. Godkar	Bhalani Publishing House
Practical Medical Microbiology	Mackey & Mac Cartney	Elsevier; 14th edition

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Anatomy and Physiology - Practical
Course Code:	SSPD7120
Prerequisite:	B.Sc. Life Sciences

Teaching and Examination Scheme:

Teaching Scheme (Hours/Week)				**Examination Scheme (Marks)**		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
0	4	0	2	40	60	100

CE: Continuous Evaluation, ESE: End Semester Examination

Objective(s) of the Course:

To impart fundamental knowledge on the structure and functions of the various systems of the human body.

Course Contents:

Anatomy and Physiology - Practical

Module	**Content**	**Hours**
1	Demo of all bones showing parts, radiographs of normal bones & joints	6
2	Demonstration of muscles of the body (as functional groups)	6
3	Demonstration of heart and chambers	6
4	Radio graphs of abdomen	6
5	Demonstration of parts of respiratory system.	6
6	Demonstration of parts of urinary system	6
7	Arterial Blood Pressure	6
8	Pulse	6
9	Heart rate	6
10	Breathing rate	6

Course Outcomes:

Course Name:	Anatomy and Physiology - Practical

CO1: Students will know proper terminology, bones, joints, and muscles of the human body

CO2: Students will identify parts of the human skeleton.

CO3: students will learn about blood pressure, pulse, heart rate, etc.

Reference Books:

Title	**Authors**	**Publisher**
Physiology & Anatomy with Practical, Considerations	ESTER. M. Grishcimer,	J.P. Lippin Cott. Philadelphia
Human Anatomy for Nursing & Allied Sciences	Dr. M.K.Anand, Dr. Meena Verma	The Arora Medical Publishers Pvt.Ltd , - 1st edition

PP Savani University
School of Sciences
Syllabus, Teaching and Examination Scheme

Course Name:	Management of Laboratories and Quality Control - Practical					
Course Code:	SSPD7160					
Prerequisite:	B.Sc. Life Sciences					
Teaching and Examination Scheme:						
Teaching Scheme (Hours/Week)				**Examination Scheme (Marks)**		
Theory	Practical	Tutorial	Credit	CE	ESE	Total
0	4	0	2	40	60	100
CE: Continuous Evaluation, ESE: End Semester Examination						
Objective(s) of the Course:						
The integrity of quality control samples is important to both management of overall quality as well as to meeting requirements of proficiency testing.						
Course Contents:						

Management of Laboratories and Quality Control - Practical

Module	**Content**	**Hours**
1	Handling of clinical Sample	6
2	Preparing Standard operating procedures (SOPs)	6
3	Components of Quality Assurance	6
4	QC for Equipment	6
5	QC for Reagents	6
6	Pre- analytical phase	6

7	Analytical phase	6
8	Post-analytical phase	6
9	Internal Quality Control Process	6
10	External Quality Control Process	6

Course Outcomes:

CO1: Students will learn appropriate specimens and handling for diagnosis.

CO2: Students will Interpret and correlate clinical and laboratory data.

CO3: Also learn about recording and reporting according to SOP.

CO4: Students will learn quality control, preparing test SOP as well as the process of QC.

Reference Books:

Title	Authors	Publisher
Text Books of Medical Laboratory Technology	Dr. Praful B. Godkar	Bhalani Publishing House
District Laboratory Practice in Tropical countries	Monica Cheesbrough	Cambridge University press 2nd edition.