

FACULTY OF SPORTS MEDICINE AND PHYSIOTHERAPY

SYLLABUS

FOR

**CERTIFICATE / DIPLOMA COURSE IN
CLINICAL DIAGNOSTIC TECHNIQUES**

(SEMESTER: I & II)

SESSION: 2019–20



**GURU NANAK DEV UNIVERSITY,
AMRITSAR**

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CERTIFICATE / DIPLOMA COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER SYSTEM)

SCHEME OF COURSE

Certificate Course in Clinical Diagnostic Techniques

Semester – I

Sr.No.	Subject	Theory	Practical	Total Marks
I.	Introduction to Human Anatomy & Physiology	40	60	100
II.	Haematology – I	40	60	100
III.	Elementary Bio-chemistry	40	60	100
IV.	Laboratory Management and Ethics	50	–	50
V.	Computer Skills – I	30	20	50
Total Marks:				400

Diploma in Clinical Diagnostic Techniques

Semester – II

Sr.No	Subject	Theory	Practical	Total Marks
VI.	Introduction to Microbiology	40	60	100
VII.	Haematology – II	40	60	100
VIII.	Clinical Pathology	40	60	100
IX.	Field Work / Project Work	-	50	50
X.	Computer Skills – II	30	20	50
Total Marks:				400

CERTIFICATE COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – I)

**PAPER – I: INTRODUCTION TO HUMAN ANATOMY & PHYSIOLOGY
(THEORY)**

Time: 2½ Hrs.

**Max. Marks: 100
Theory Marks: 40
Practical Marks: 60**

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A

Anatomical structure of human body-parts, terms and planes.

- Gastro intestinal tract.
- Salivary glands, stomach, intestine.
- Liver, Gall bladder, spleen, pancreas

Section – B

- Respiratory system
- Kidneys, Ureter, Bladder.
- Testes (male genital organ)
- Ovaries, Uterus, Vagina, Urethra.

Section – C

Digestive System:

- Function of stomach, saliva, gastric juice, pancreatic juice.
- Endocrine glands, name and Hormones secreted.
- Action of hormones.

Respiratory System:

- Organs of Respiration.
- Transport of O₂ and CO₂ in the blood.

Section – D

Circulatory System:

- Heart structure and function.
- Blood composition and function.
- Normal counts of blood cells and their functions.
- Steps of coagulation, anticoagulants
- Blood grouping, ABO and Rh typing Blood vessels.
- Circulation
- Pulse, Blood pressure, Electrocardiogram.

Excretory System:

- Functions of Kidneys.
- Functions of Glomerular tubules.
- Composition of normal and abnormal urine.

Reproductive System:

- Sex organs, male and female.
- Fertilization

CERTIFICATE COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – I)

**PAPER – I: INTRODUCTION TO HUMAN ANATOMY & PHYSIOLOGY
(PRACTICAL)**

1. Study of permanent slides of cells and tissues
2. Surface marking of body.
3. Skeletal system, bones and joints.
4. Cardiac resuscitation, First Aid.
5. Visit to Anatomy Museum

CERTIFICATE COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – I)

**PAPER – II: HAEMATOLOGY – I
(THEORY)**

Time: 2½ Hrs.

**Max. Marks: 100
Theory Marks: 40
Practical Marks: 60**

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A

Introduction: Composition of blood, its formation and functions Collection of blood:- Different routes, difference between capillary and venous sample Anticoagulants :- Different types, method of preparation and uses

Section – B

Haemoglobin: Normal and abnormal values and Physiological variations Estimation by (a) Colorimetric Method, (b) Sahlis method, Clinical importance.

Section – C

Red Blood Cells:-

Total Count:- Normal, abnormal values, and Physiological variations,

Section – D

Haemocytometer - method and calculations,

- White cell count - TLC
- Differential white cell count. (DLC)
- Bleeding Time & Clotting Time

CERTIFICATE COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – I)

**PAPER-II: HAEMATOLOGY-I
(PRACTICAL)**

1. Collection of Blood - ways of collection.
2. Use of Anticoagulants.
3. Red cell count - Haemocytometry.
4. White cell count - TLC
5. Differential white cell count. (DLC)
6. Bleeding Time & Clotting Time
7. Determination of Haemoglobin by Sahlis Method.

CERTIFICATE COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – I)

**PAPER – III: ELEMENTARY BIO-CHEMISTRY
(THEORY)**

Time: 2½ Hrs.

**Max. Marks: 100
Theory Marks: 40
Practical Marks: 60**

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A

1. Introduction of Biochemistry
2. Elementary knowledge of inorganic chemistry : - Atomic weight, molecular weight, equivalent weight, acid, bases.
3. Definition and preparation of solutions : - Percent solution, Molar solution, Normal solution and Buffer Solution etc.

Section – B

1. Definition and preparation of Regent.
2. Unit of measurement
3. Elementary knowledge of organic chemistry
 - Organic compounds
 - Aliphatic and Aromatic
 - Alcohols, Aldehydes, Ketones, Amines, Esters, Phenol etc
4. pH indicators : pH paper, universal and other indicators, pH measurement : different

Section – C

Elementary knowledge, handling, maintenance, and care of analytical instruments.

- a) Centrifuge
- b) Balance
- c) Colorimeter
- d) Autoclave

Section – D

Definition, classification and examples of carbohydrates, proteins, and lipids.

CERTIFICATE COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – I)

**PAPER – III: ELEMENTARY BIO-CHEMISTRY
(PRACTICAL)**

1. Principals and working of laboratory instruments:
 - I. Centrifuge.
 - II. Colorimeter.
 - III. Spectrophotometer.
 - IV. Microscope
 - V. Autoclave
 - VI. flame photometer
2. Importance and methods of cleaning of glass apparatus
3. Calibration of apparatus and glass-wares
4. Preparation and standardisation of volumetric solutions.
5. Basic titration such as acid Vs alkali, Silver Nitrate Vs Sodium Chloride
6. Preparation of buffer solution and measurement of their pH

CERTIFICATE COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – I)

**PAPER – IV: LABORATORY MANAGERMENTS & ETHICS
(THEORY)**

Time: 2½ Hrs.

Max. Marks: 50

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A

Role of laboratory in Health care, delivery.

- i. General
- ii. Human health & Diseases.
 - a) Types of diagnosis, b) Process of diagnosis.
- iii. Laboratory at different levels.
- iv. Duties & responsibility.

Section – B

Laboratory organization.

- i. General principles
- ii. Components & functions of laboratory.
- iii. Staffing the laboratory.
- iv. Job descriptions.
- v. Job Specifications.
- vi. Work schedule.

Section – C

Care of laboratory glassware, equipment and chemicals.

- i. General principles.
- ii. Care & cleaning of glasswares.
- iii. Making simple glass wares in the laboratory.
- iv. Care of equipments and apparatus.
- v. Laboratory chemicals their proper use and care.
- vi. Proper storage.
- vii. Labelling.

Section – D

Specimen handling.

- i. General principles
- ii. Collection techniques and containers for specimen.
- iv. Types of specimens.
- v. Specimen entry.
- vi. Specimen transport.
- vii. Specimen transfer and distribution & reassignment.
- viii. Specimen Disposal.
- ix. Specimen preservation.

CERTIFICATE COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – I)

**PAPER – V: COMPUTER SKILLS – I
(THEORY)**

Time: 2 Hrs.

**Max. Marks: 50
Theory Marks: 30
Practical Marks: 20**

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A

Fundamentals of Computer:

Introduction to computer, Applications of computer, Components of computers, Input-output devices (key boards, mouse, track ball, light pen, cards, printers, plotters, scanners).

Section – B

Secondary storage devices (floppy disk, magnetic disk, Winchester disk, optical disk) Types of software, Translators (compiler, interpreter, assembler), Introduction to data communication and network.

Section – C

Introduction to Windows Vista:

Parts of window screen (Desktop, window, icons), start menu, Taskbar settings, application & document window, anatomy of a window (Title bar, minimize, maximize button, control box, scroll bars, scroll buttons, scroll boxes), Window explorer (expansion, collapsing of directory tree, copying, moving, deleting files, folder, creating folders).

Section – D

About desktop icons (recycle bin, my computer, network neighborhood, briefcase), folder, shortcut creation, setting of screen saver, color settings, wallpaper, changing window appearance.

CERTIFICATE COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – I)

Practical Paper – V

Practical Based on Theory Paper – V (COMPUTER SKILLS-I)

DIPLOMA COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – II)

**PAPER – VI: INTRODUCTION TO MICROBIOLOGY
(THEORY)**

Time: 2½ Hrs.

Max. Marks: 100

Theory Marks: 40

Practical Marks: 60

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A

1. Introduction to Microbiology, Morphological classification of Bacteria.
2. Cultivation of bacteria aerobic and anaerobic.

Section – B

Culture media, types of media, special media.

Section – C

Sterilization and Disinfection (Physical and Chemical methods) and Pathogenicity of Staphylococci, Streptococci, Salmonella, Shigella and Vibrio.

Section – D

1. Antimicrobial susceptibility test.
2. Preservation of stock cultures.

DIPLOMA COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – II)

**PAPER – VI: INTRODUCTION TO MICROBIOLOGY
(PRACTICAL)**

1. Gram staining technique.
2. Acid fast staining (Z-N)
3. Motility by hanging drop method.
4. Cultivation of UTI isolates.
5. Culture and sensitivity test (Kirby-Bauer method)
6. Biochemical test (Glucose, Lactose, Mannitol, Indole, MR, V.P.Citrate)

DIPLOMA COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – II)

**PAPER – VII: HAEMATOLOGY-II
(THEORY)**

Time: 2½ Hrs.

**Max. Marks: 100
Theory Marks: 40
Practical Marks: 60**

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A

1. Absolute Eosinophil count.
2. ESR
- 3.. Haematocrit - Packed cell volume (PCV)

Section – B

1. Haemoglobin estimation.
2. Red cell Indices MCV, MCH, MCHC.
3. Reticulocyte count.

Section – C

1. Sickel cell preparation.
2. Osmotic Fragility test.
3. Preparation of Bone Marrow.

Section – D

1. Morphology of Normal and Abnormal cells.
2. Coagulation test.

DIPLOMA COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – II)

**PAPER – VII: HAEMATOLOGY – II
(PRACTICAL)**

1. Absolute Eosinophil Count
2. Reticulocyte count
3. E.S.R. determination
4. Platelet Count
5. Prothrombin time
6. Osmotic Fragility Test
7. Bone Marrow Smear Preparation, Staining and Examination
8. ABO Grouping
9. Cross matching – Major and Minor
10. Rh typing

DIPLOMA COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – II)

**PAPER – VIII: CLINICAL PATHOLOGY
(THEORY)**

Time: 2½ Hrs.

**Max. Marks: 100
Theory Marks: 40
Practical Marks: 60**

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A

Examination Of Urine:

Indication, Collection, Container, Transport, Preservation of,urine for different types of urine analysis Physical examination and its significance,Chemical examination and its significance, Microscopic examination and its significance

Section – B

Examination of Stool:

Indication, Collection, Container, Transport, Preservation,for different types of fecal analysis, Physical examination and its significance, Chemical examination and its significance, Microscopic examination and its significance

Section – C

Examination of Sputum:

Indication, Collection, Container, Transport,Preservation for different types of sputum analysis,Physical examination and its significance,Chemical examination and its significance,Microscopic examination and its significance.

Semen Analysis:

Indication, Collection, Container, Transport,Preservation for different types of semen examination, Physical examination and its significance, Chemical examination and its significance , Microscopic examination and its significance

Section – D

Examination of CSF and Other Body Fluids Like Pleural Fluid, Pericardial Fluid, Peritoneal Fluid, Synovial Fluid, Ascitic Fluid.

Indication, Collection, Container, Transport, Preservation for different types of CSF / Fluid analysis, Physical examination and its significance , Chemical examination and its significance, Microscopic examination and its significance

DIPLOMA COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – II)

**PAPER – VIII: CLINICAL PATHOLOGY
(PRACTICAL)**

1. Stool examination for ova, cyst, Amoeba, Exudate, fat globule.
2. Routine Urine analysis.
3. Sputum Analysis.
4. Semen Analysis.
5. C.S.F. examination.
6. Bone Marrow smear Preparation.

DIPLOMA COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – II)

PAPER – IX: FIELD WORK / PROJECT WORK

Max. Marks: 50

Field work / Project Work: Project work / field work involving laboratory work and based on critical study of any one of the topics included in theory or practical.

DIPLOMA COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – II)

**PAPER–X: COMPUTER SKILLS– II
(THEORY)**

Time: 2 Hrs.

**Max. Marks: 50
Theory Marks: 30
Practical Marks: 20**

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A

MS-Word: Introduction to MS-Office, MS-Access, MS-Excel. Parts of window of word (Title bar, menu bar, status bar, ruler), Creation of new documents, opening document, insert a document into another document. Page setup, margins, gutters, font properties, Alignment, page breaks, header footer deleting moving, replace, editing text in document. Saving a document, spell checker, printing a document.

Section – B

Creating a table, entering and editing, Text in tables. Changing format of table, height width of row or column. Editing, deleting Rows, columns in table. Borders, shading, Templates, wizards, drawing objects, mail merge

Section – C

MS-Excel: Introduction to Worksheet/Spreads, Features of excel. Describe the excel Window, different functions on different data in excel, creation of graphs, editing it and formatting, changing chart type to 2d chart or 3d chart.

Section – D

creation of worksheet, adding, deleting, moving the text in worksheet, linking different sheets, sorting the data, querying the data, filtering the data (auto and advance filters), What-if analysis, printing a worksheet.

CERTIFICATE COURSE IN CLINICAL DIAGNOSTIC TECHNIQUES
(SEMESTER – II)

PAPER – X: (PRACTICAL)

Practical Based on Theory Paper – X: COMPUTER SKILLS–II