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## Syllabus of Diploma in Medical Laboratory Technology

### FIRST YEAR

S.No.	Subject	Distribution of Marks			
		Th	PR	Viva-voce	Total
Paper I	Communication skills in English	100	-	-	100
Paper II	Computer application	100	-	-	100
Paper III	Anatomy and Physiology	100	-	-	100
Paper IV	Hematology and blood banking	100	-	-	100
Paper V	Clinical pathology	100	-	-	100
PRAC	Clinical practical training		400	200	600
PRAC	MLT Instruments Practice Lab – 1		25+25(50)	50+50(100)	150
PRAC	Hospital Industrial Training		25+25+25+25(100)		100
	<b>Total</b>				<b>1350</b>

## Syllabus of Diploma in Medical Laboratory Technology

### SECOND YEAR

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		Th	PR	Viva-voce	Total
Paper I	Entrepreneurship & Professional Management	100	-	-	100
Paper II	Environmental studies	100	-	-	100
Paper III	Microbiology including parasitology and immunology.	100	-	-	100
Paper IV	Pathology	100	-	-	100
Paper V	Biochemistry	100	-	-	100
PRAC	Clinical practical training – II		400	200	600
PRAC	MLT Instruments Practice Lab-II		25+25(50)	50+50(100)	150
PRAC	Hospital Industrial Training		25+25+25+25(100)		100
	<b>Total</b>				<b>1350</b>

Nesary.

सहायक आचार्य

वि. ३०१, वि. कक्षा विभाग  
सवाई राम सिंह स्नातकोत्तर महाविद्यालय  
जयपुर-302 004.

# Syllabus of Diploma in Medical Laboratory Technology

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Grand Total : 1350

## Syllabus of Diploma in Medical Laboratory Technology

Sr. No.	Subjects
1	Communication skills in English.
2	Computer application.
3	Anatomy and Physiology.
4	Hematology and blood banking
5	Clinical pathology.
6	Clinical practical training.
7	MLT Instruments Practice Lab – 1.
8	Hospital: - Industrial training (4 Weeks) in summer vacation

### Communication skills in English.

#### RATIONALE

The students seeking admission to the diploma course do not have the required proficiency in English. It has, therefore, been decided to introduce English and Communication Techniques to help them to attain proficiency in the subject.

#### CONTENTS

1. Narration, Voice, Basic sentence patterns. (Nine basic sentence patterns)
2. Transformation sentence, Determiners, Preposition.
3. Tenses, Common errors (Noun, Pronoun, Articles, Adverb, Punctuation, Preposition etc.)
4. Modals in conversational usages, prefix, suffix, idioms & phrasal verbs.

*Modals :*

Can/Could/Should : Will/Would/May/Might: Must/Need not; dare not/ ought to/ use to.

*Phrases:*

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At all; instead of; in spite of; as well as ; set up; upset; look up; call off; call out; come across; set right; look other.

*Idioms :*

Workup (Excite); Breakdown; stand up for; turn down; pass away; pass on; backup; back out; carry out; done for (Ruined); bring about; go through; ran over; look up (Improve); pick out (Selected).

5. Letter writing, Paragraph writing, Report writing.

#### REFERENCE BOOKS

- |   |  |
|---|--|
| 1. Intermediate English Grammar :                       | Raymond Murphy<br>Pub : Foundation Books, New Delhi.                             |
| 2. Eng. Grammar, Usage & Composition:                   | Tickoo & Subramanian<br>Pub : S Chand and Co.<br>Standard Alien<br>Pub : Longman |
| 3. Living Eng. Structure:                               | Standard Alien.<br>Pub : Longman   |
| 4. A Practical Eng. Grammar :<br>and its Exercise Books | Thomson and Martinet.<br>Pub : ELBS  |
| 5. High School English Grammar<br>and Composition       | Hiren & Martin   |

### Computer Applications

#### RATIONALE

The course has been designed to provide an introduction to computer technology and its tools. The student will be able to understand the basics of computer and its application. The student will be able to appreciate the role of computer technology, more specifically computer hardware, software and its application in the present social and economic scenario.

The course has focus on the following :-

- Computer organization.
- Computer operating systems and software.
- MS Windows, Word Processing.
- Presentation packages.

#### CONTENTS

Computer Application, Characteristic of computers, Input, Output, Storage units, CPU Computer systems.

1. Computer Organization.
2. Central processing unit
  - 2.1 Memory
    - 2.2.1 Main Memory
    - 2.2.2. Storage Evaluation Criteria.
    - 2.2.3 Memory Organization
    - 2.2.4 Memory capacity
    - 2.2.5 Random Access Memory
    - 2.2.6 Read only Memory
    - 2.2.7 Secondary Storage Devices.
      - 2.2.7.1 Magnetic disk
      - 2.2.7.2 Floppy and Hard disk

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- 2.2.7.3 Optical disk CD-ROM
- 2.2.7.4 USB & Memory Cards other mass storage devices.
- 2.2 Input Devices
  - 2.3.1 Key board
  - 2.3.2. Mouse
  - 2.3.3. Scanner.
  - 2.3.4 Card Reader
- 2.3 Output Devices
  - 2.4.1 Monitors
  - 2.4.2. Printers
    - 2.4.2.1. Dot matrix printers.
    - 2.4.2.2. Inkjet printers.
    - 2.4.2.3. Laser printers.
    - 2.4.2.4. Multimedia Projector
- 2.4 Computer Software
  - 2.6.1 Relationship between hardware and software.
  - 2.6.2 Application of computer.
- 3. Operating systems
  - 3.1 Microsoft windows
  - 3.2 .1 An overview of other operating systems.
  - 3.2.2 Basic windows elements
  - 3.2.3 File management through windows.
  - 3.2.4 Using essential accessories : Systems tools Disk cleanup, Disk Fragmenter, Calculator, Imaging Fax, Notepad, Paint, Wordpad, Recycle Bin, Windows Explorer, Creating Folders, Icons.
- 4. Word Processing
  - 4.1 Word processing concepts.
  - 4.2 Saving closing, opening an existing and new documents.
  - 4.3 Selecting text, Editing text.
  - 4.4 Finding and replacing text.
  - 4.5 Printing documents.
  - 4.6 Creating and printing merged documents, Mail merge.
  - 4.7 Character and paragraph formatting, page design and layout.
  - 4.8 Editing and proofing tools, Checking and correcting spellings, creating macros.
  - 4.9 Handling Graphics.
  - 4.10 Creating tables and charts.
  - 4.11 Document templates and wizards.
- 5. Presentation Package (Power point)
  - 5.1 Creating, Opening and saving presentations.
  - 5.2 Creating the look of your presentation.
  - 5.3 Working in different views, working with slides.
  - 5.4 Adding and formatting text, Formatting paragraphs.
  - 5.5 Checking spelling and correcting typing mistakes.
  - 5.6 Making notes pages and Handouts.
  - 5.7 Drawing and working with objects.
  - 5.8 Adding clip art and other pictures.
  - 5.9 Designing slides shows.
  - 5.10 Running and controlling a slide show.
  - 5.11 Printing presentations.

REFERENCE BOOKS

  
**सहायक आचार्य**  
 शिक्षण विभाग विद्यालय  
 सर्वोच्च मानसिक प्रामुखियान महाविद्यालय,  
 जयपुर-302 004.

1. P.K. Sinha and P. Sinha- "Foundation of computing" First edition, 2002 BPB Publication.
2. S. Sagman, "Microsoft Office 2000 for window" Second Indian Print 2001 – Pearson Education.

### Anatomy and Physiology

#### RATIONALE

The study of basic anatomy and physiology is essential because it will help in understanding the basic structure of the human body and normal function in health. During disease the normal function may likely to be affected. By various laboratory tests, the student will be able to know the abnormal functioning of the body and ultimately helps in diagnosis of the disease.

#### CONTENTS

1. Anatomy and Physiology of the human body.
  - Cells : Structure and function
  - Tissues : Epithelial, Muscular, Connective (Cartilage and bone) and necrosis.
  - Blood
  - Circulatory system
  - Digestive system
  - Respiratory system
  - Nervous system
  - Endocrine system
  - Urinary system
  - Ear, Nose, Tongue and skin.
  - Skeletal system
  - Muscular system
  - Reproductive system

#### REFERENCE BOOKS

1. Medical laboratory manual for tropical :                      Monica Chesbrough  
countries Vol. I & II    ELBS Edition
2. Practical Microbiology    Prof. C.P. Baveja  
Arya Publications, New Delhi

### Hematology and Blood Banking

#### RATIONALE

Hematology and blood banking are very important branches of laboratory medicine. The student will be able to know the basic components of blood and their significance in normal health, by examination of blood, various types of diseases can be diagnosed.

#### CONTENTS

Clinical Pathology and Quality Control

Clinical Pathology

- Introduction to clinical pathology & safety measures in lab.
- Quality control – Internal and external.
- Urine analysis
- Collection, composition, preservation and gross examination of urine.
- Chemical and microscopic examination of urine.
- Cerebrospinal fluid (CSF) examination.

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- Examination of other body fluids.
- Semen analysis.
- Norms of biomedical waste and discarding of infected blood.

#### Hematology

Introduction to clinical hematology, instruments and glassware's used in hematology washing of laboratory glassware.

Preparation of various stains, buffers and other solution used in hematology.

Methods of collection of blood sample and anticoagulants used in different tests and various types of vacutainers.

- Red blood cell counting.
- White blood cell count and absolute eosinophil count.
- Platelet and reticulocyte count.
- Methods of hemoglobin estimation, their merits and demerits.
- Packed cell volume.
- Blood indices.
- Erythrocyte sedimentation rate.
- Preparation and staining of peripheral blood smear.
- Morphology of normal and abnormal forms of RBC's.
- Morphology of normal and abnormal forms of Leucocytes.
- Differential Leucocyte count.
- Bone marrow examination – Different sites and needles used.
- Osmotic fragility test.
- Estimation of foetal haemoglobin.
- G6PD Estimation.
- Sickling test.
- Automation in Hematology – Basic principals

#### Blood Banking

- Screening and selection of donor.
- Collection and storage of blood.
- Blood grouping – A B O RH, and other systems of blood groups, sub group of A, Bombay group, Antibodies to ABO System, Anti AB and Anti H antibody.
- ABO testing slides and tube test, reverse grouping, discrepancies between cell and serum results, sources of error, rouleux formation and methods of checking it.
- RH grouping test slide or rapid tube test false – Positive and false – Negative results, Du system & its significance.
- Cross matching, reasons of cross match, saline, albumin, coombs and enzymes in testing.
- Coombs test- Directed and indirect, principle, explanation of procedure and sources of error control, interpretation and clinical application.
- Preparation of various components of the blood and their storage.
- Grouping and cross matching by Gel techniques.

#### REFERENCE BOOKS

- |   |  |
|---|--|
| 1. Medical Laboratory manual for tropical :<br>countries Vol. I & II                                    | Monica Chesbrough<br>ELBS Edition                          |
| 2. Medical Laboratory technology :<br>A procedure manual for routine<br>Diagnostic Tests Vol I, II, III | Kanai L. Mukharjee<br>Tata Mc Graw – Hill Pub<br>New Delhi |
| 3. Dacie and Lewis :<br>Practical Hematology  | S.M. Lewis<br>B.J. Jain<br>1. bates Churchil Livingstome   |

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 स्वर्ण मान सिंह क्राय विज्ञान महाविद्यालय  
 जयपुर-302 004.

- |   |  |
|---|--|
| 4. De Gruchy's :<br>Clinical Hematology in Medical Practice | Frank Firlin<br>Colin Cheterman<br>David Penington and Bryan Rush                      |
| 5. Manual of basic techniques for a :<br>Health Laboratory  | WHO Publication,<br>World health house, Indrapratha<br>Estate, Ring Road, New Delhi-02 |

### Clinical Pathology

#### RATIONALE

It helps in monitoring the normal functioning of different systems of human body abnormal clinic-pathological results give a clue regarding a disease process going on inside the body.

#### CONTENTS

- Complete urine examination.
- Semen analysis.
- CSF and other body fluids examinations
- Blood cell counts including reticulocyte count
- Haemoglobin estimation, Haemoglobin electrophoresis.
- Determination of PC; ESR and blood indices.
- L.E. cell test, test for cold agglutination.
- Preparation and staining of peripheral blood and bone marrow smears.
- Differential leucocyte count.
- Osmotic fragility test
- Sickling test
- Foetal haemoglobin estimation
- G6PD estimation.
- Blood grouping and cross matching
- Organization of blood bank, separation and uses of various components of blood.
- Transfusion reactions.

#### REFERENCE BOOKS

- |   |   |
|---|---|
| 1. Medical Laboratory manual for tropical :<br>countries Vol. I & II                                    | Monica Chesbrough<br>ELBS Edition                           |
| 2. Medical Laboratory technology :<br>A procedure manual for routine<br>Diagnostic Tests Vol I, II, III | Kanai L. Mukharjee<br>Tata Mc Graw – Hill Pub.<br>New Delhi |
| 3. A color atlas of practical Pathology :<br>and microbiology   | Remnik Sood<br>Jaypee brothers, New Delhi                   |

### Clinical Practical Training – I

#### RATIONALE

It is very important for a medical laboratory trainee to have practical knowledge of various laboratory tests. The student will be able to interpret correctly the test results and correct diagnosis of a disease.

#### CONTENTS

Practicals related to theory papers i.e. Basic Anatomy & Physiology, Hematology and blood banking and clinical pathology.

#### REFERENCE BOOKS

- |  |                                   |
|--|-----------------------------------|
| 1. Medical Laboratory manual for tropical :<br>countries Vol. I & II | Monica Chesbrough<br>ELBS Edition |
| 2. Medical Laboratory technology :                                   | Kanai L. Mukharjee                |

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**सहायक आचार्य**

विश्वविद्यालय, दिल्ली

सुधीर मान सिंह आयुर्विज्ञान महाविद्यालय

जयपुर-302 004.



# Syllabus of Diploma in Medical Laboratory Technology

## SECOND YEAR (PAPER SCHEME)

S.No.	Subject	Distribution of Marks			
		Th	PR	Viva-voce	Total
Paper I	Entrepreneurship & Professional Management		-	-	
Paper II	Environmental studies		-	-	
Paper III	Microbiology including parasitology and immunology.		-	-	
Paper IV	Pathology		-	-	
Paper V	Biochemistry		-	-	
PRAC	Clinical practical training – II		400	200	
PRAC	MLT Instruments Practice Lab-II		50+50(100)	25+25(50)	
PRAC	Hospital Industrial Training			25+25+25+25(100)	
	<b>Total</b>				1350

Grand Total : 1350

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2	Environmental studies
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4	Pathology
5	Biochemistry
6	Clinical practical training – II
7	MLT Instruments Practice Lab-II
8	Hospital: - Industrial training (4 Weeks) in summer vacation

### Entrepreneurship & Professional Management

Common all branches of Para-medical programmes.

#### RATIONALE

As the opportunities for wage employment are reducing day by day, Govt. of India and State Govt. directed to develop entrepreneurship among the students. Entrepreneurship training is essential to make aware the students of different branches of diploma course about the scope of employment outside the Govt. sector.

It will equip them with the necessary skills and training for setting up a small scale enterprise in their own area of study. This course includes the procedure how to select, proceed and start the small enterprises.

To achieve the targets and goals in an organization, it is essential to co-ordinate the entire system. For this the knowledge of principles of management, personnel management..... Management is required.

#### CONTENTS

*Neeraj*

सहायक आचार्य

विद्यार्थी विभाग, विद्यापीठ

सवाई मान सिंह ज्ञानविज्ञान महाविद्यालय

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1. Entrepreneurship
  - 1.1 Definition, basic concept, need, scope and characteristics of entrepreneurship.
  - 1.2 Women entrepreneurship
  - 1.3 Assistance to small scale enterprises from national level organizations like SIDO, NSIC, NRDC, KVIC.
  - 1.4 Assistance to small scale enterprises from state level organizations like DOI, DIG, RTC, SISI, RHDC, Pollution control board, Rajasthan Khadi and village industries to women entrepreneurs.
  - 1.5 Facilities to women entrepreneurs.
2. Emerging Areas in Entrepreneurship
  - 2.1 Innovation and creativity
  - 2.2 Introduction to intellectual property rights (IPRs) & patents.
  - 2.3 National knowledge commission : Basic concept need and scope.
  - 2.4 Service sector : Scope and future trends.
  - 2.5 Energy and auditing
3. Project Formulation Process
  - 3.1 Steps in planning a small scale enterprises.
  - 3.2 Structure of project report.
  - 3.3 Analysis of sample, project reports.
  - 3.4 Preparation of project reports.
  - 3.5 Techno-economic and feasibility of the project.
4. Financial sources for SSI Loan
  - 4.1 State Govt. RFC, Credit facilities by banks.
5. Rules and Regulations
  - 5.1 Licensing and registration procedure
  - 5.2 Important provisions of Factory Act.
  - 5.3 Shop and commercial Establishment Act.
  - 5.4 Sales of Goods Act.
  - 5.5 Partnership Act.
  - 5.6 Value Added Tax (VAT)
  - 5.7 Service tax
  - 5.8 Professional Tax
  - 5.9 Income tax
  - 5.10 Sales tax and Excise Rules
  - 5.11 Municipal bye laws and insurance coverage.
  - 5.12 Introduction to equipments
6. Meaning and scope business
  - 6.1 Definition of profession, trade and industry.
  - 6.2 Objective of business and profession
  - 6.3 Types of business organization
  - 6.4 Brief description, advantage and disadvantages of individual-partnership-cooperative private and public limited organizations,
  - 6.5 Characteristics of small business ethics, organization charts.
7. Management Techniques
  - 7.1 Leadership authority, responsibility
  - 7.2 Functions of management
8. Quality control
  - 8.1 Meaning, importance of keeping standard.
  - 8.2 Factors responsible for deviation from standards.
  - 8.3 ISO and ISO – 9000 to 9006
  - 8.4 Total quality management
9. Financial Management

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सहायक आचार्य

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सुवाई मान सिंह ज्ञानविज्ञान महाविद्यालय

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- 9.1 Sources of Finance
- 9.2 Brief idea of cash and credit, cheques, drafts, bill of exchanges, promissory note.
10. Marketing
  - 10.1 Basic concept
  - 10.2 Market promotion
  - 10.3 Branching, packaging, pricing planning and development
  - 10.4 Advertisement media and effectiveness
  - 10.5 Sales forecasting marketing fix-pricing policy, sales promotion and salesmanship
  - 10.6 After sales service, complaints and their redressal.
11. Human Relations
  - 11.1 Motivating the employers
  - 11.2 Inter personnel relations
  - 11.3 Grievances and their handling
  - 11.4 Staff requirement, training and monitoring
12. Foreign Trade
  - 12.1 Export procedure
  - 12.2 Channels of distribution in export trade
  - 12.3 Export promotion
  - 12.4 Registration of firm, Factory in R.B.I., AEPC or others.

Note : Entrepreneurship awareness camp should be arranged for 3 to 4 day at a stretch. No question will be asked in the examination from the topics under entrepreneurship awareness camp.

Entrepreneurial Awareness camp :

Topics to be covered by camp :

1. Who is an entrepreneur
2. Need for entrepreneurship, entrepreneurial career and wage employment
3. Scenario of development of small scale enterprises in india
4. Entrepreneurial history in india, Indian values and entrepreneurship
5. Assistance from District Industries Center, Commercial banks, State Financial Corporation, Small industries service institute, Research and development laboratories and other financial and development corporations.
6. Considerations for product selection.
7. Opportunities for business, service & entrepreneurship ventures.
8. Learning from Indian experiences in entrepreneurship (Interaction with successful entrepreneurs should be arranged.)

The camp can be arranged by the institutions itself **with the help of other agencies such as RIICO, DIC, Science and Technology Department, Rajcon, Department of Industries, SISI, E.D. Cells etc.**

#### REFERENCE BOOKS

- |   |                           |
|---|---------------------------|
| 1. Hand book of small scale industry:                     | P.M. Bhandari             |
| 2. Hand book of entrepreneurship development :            | O.P. Harkut               |
| 3. Entrepreneurial development :                          | S.S. Khanka.              |
| 4. Statistical quality control :                          | Manohar Mahajan           |
| 5. ISO : 9000 Quality system – 2000 :                     | S. Dalela                 |
| 6. ISO : 14000  |                           |
| 7. Organizations & Management of small scale industries : | Desai J.V. Himalaya       |
| 8. Management of small scale industries :                 | Bombay, 1985              |
|   | 3 <sup>rd</sup> Himalaya, |

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- 5.4 Sanitary land filling
- 5.5 Vermi – composting
- 5.6 Hazardous waste management
6. Land pollution
  - 6.1 Soil conservation
  - 6.2 Land erosion
  - 6.3 Afforestation
7. Ecology
  - 7.1 Basics of species
  - 7.2 Biodiversity
  - 7.3 Population
  - 7.4 Energy flow
  - 7.5 Ecosystems
8. Social issues and the environment
  - 8.1 Sustainable development and life style
  - 8.2 Urban problems related to energy
  - 8.3 Resettlement and rehabilitation of people
  - 8.4 Environmental ethics
  - 8.5 Consumerism and waste products
9. Water harvesting and rural sanitation
  - 9.1 Water harvesting techniques
  - 9.2 Different schemes of rural water supply in Rajasthan
  - 9.3 Rural sanitation
  - 9.4 Septic tank
  - 9.5 Bio-gas
  - 9.6 Collection and disposal of wastes.
  - 9.7 Community awareness and participation.
10. Miscellaneous
  - 10.1 Non-conventional (Renewable ) source of energy
  - 10.2 Solar energy, wind energy, bio-mass energy, hydrogen energy

Practical work :

1. Visit to local air pollution site
2. Visit to local water polluted site
3. Visit to local area to document environment assets – Mountain/Desert/River/Forest.
4. Study of local birds, plants, insects.
5. Plantation work
6. Environmental awareness campaign through exhibition.

After visit/study, the students will prepare posters, charts, reports.

REFERENCE BOOKS

- |   |  |
|---|--|
| 1. Paryavaran shiksha :                                   | Dr. A.N. Mathur, Dr. N.S. Rathore,<br>Dr. V.K. Vijay |
| 2. Paryavaran Adhyayan :                                  | Dr. Ram kumar Gujar, Dr. B.C. Jat                    |
| 3. Paryavaran Avabodh :                                   | Dr. S.D. Ojha  |
| 4. Environmental chemistry & Pollution control:           | S.S. Dora  |
| 5. Ecology concepts and application :                     | Manuel C. Mathur                                     |
| 6. Environment protection :                               | Email T. Chanlett                                    |
| 7. Environmental Science :                                | Cumingham Snigo                                      |
| 8. Solid waste management :                               | C.I. Mantel  |
| 9. Introduction to environment engineering :<br>& Science | Gilbert M. Masters Prentica Hall of India<br>1995    |

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**सहायक आचार्य**  
 वि. वि. विद्यालय, विजयपुर  
 सुवाई मान सिंह आयुर्विज्ञान महा विद्यालय  
 जयपुर-302 004.

- |  |                                      |
|--|--------------------------------------|
| 10. Concept of ecology, 1991 :                             | Edward J Kormondy                    |
| 11. Ecology, 1975 :  | Odum                                 |
| 12. Environmental Engineering :                            | Paavy Rowe, Tehobaniglum             |
| 13. Environment impact assessment                          | Mc Graw Hill, New York, 1977         |
| 14. Environmental technologies for sustainable Development | :Dr. Upendra Pandel, Dr. M.P. Poonia |
| 15. Environmental pollution & Management :                 | V.K. Kholi & Vikas Kohli             |
| 16. पर्यावरण विनाश के कगार पर :                            | राजीव गुप्ता                         |
| 17. पर्यावरण जीवों का आगमन :                               | प्रेमानन्द मंदोता                    |
| 18. पर्यावरण (वैमासिक) :                                   | पर्यावरण एवं वन मंत्रालय, नई दिल्ली  |
| 19. Panda News Letter :                                    | WWF-India, New Delhi                 |

..... faculty for teaching the subject : Faculty of Civil Engineering or M.Sc. in Environment or P.G..... environment and sustainable development.

**Microbiology**  
**Including parasitology & Immunology**

**RATIONALE**

A large number of diseases are caused by infections organisms. The microbiology and parasitology give knowledge of various infections agents and their role in different infectious diseases. Immunology deals with immune system and its role in normal health and various diseases.

**CONTENTS**

1. Human Parasitology
  - Protozoa- classification, morphology life cycle (Diagrammatic) and lab diagnosis (short) E. Histolytica, giardia intestinalis, malarial parasite, trichomonas, leishmania, trypanosome, toxoplasma.
2. Nematodes
  - Classification, morphology life cycle (Diagrammatic) and lab diagnosis (Short) ascaris, ankylostoma duodenale, enterbius, vermicularis, trichuris, strongyloides, dracunculus, ....., wuchereria, banacrofti, onchocerea.
3. Platyhelminthes
  - Classification – Names with general outline, morphology, life cycle (Chart)
  - Lab Diagnosis (Short)
  - Teaenia solium
  - Taenia saginata
  - Hymenolepis nana
  - Echinococcus granulosus
4. Systemic bacteriology
  - Morphology, culture, identification and laboratory diagnosis.
  - 4.1 Gram positive cocci – staphylococci, streptococci, pneumococci.
  - 4.2 Gram negative cocci – Neisseria
  - 4.3 Gram negative bacilli – Classification of enterobacteriaceae.
    - Morphology
    - Culture
    - Biochemical diagnosis.
    - Laboratory diagnosis
    - Coli, klebsiella, Enterobacter, Proteus, Salmonella, Shigella, Vibrio Pseudomonas.
5. Fastidious
  - 5.1 Haemophilus

*Neeraj*

**सहायक प्राचार्य**

विश्वविद्यालय विभाग

सर्वोच्च शिक्षण आयोग, नई दिल्ली

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- 5.2 Gram positive bacilli
  - Morphology, culture, biochemical identification and lab diagnosis.
  - Corynebacterium.
  - Clostridium
  - Bacillus
- 5.3 Spirochaetes – Morphology and serological (T. Pallidum diagnosis)
- 5.4 Mycobacteria – Morphology classification identification by biochemical tests.
- 6. Virology
  - 6.1 General character with classification
  - 6.2 Human immune deficiency virus
  - 6.3 Hepatitis viruses.
- 7. Immunology
  - 7.1 Antigen antibody reaction – Principles and practical application of various types of serological tests – Precipitation, agglutination, complement fixation test, neutralization, ELISA, Radio immuno assay, electrophoresis, immunofluorescence, polymerase chain reaction (in short).
  - 7.2 Hyper sensitivity – Definition and type only.

#### REFERENCE BOOKS

- |   |   |
|---|---|
| 1. Medical laboratory manual for tropical Countries Vol I & II                                    | Monica Chesbrough<br>ELBS Edition                       |
| 2. Medical laboratory technology A procedure manual for Routine Diagnostic Tests Vol. I, II & III | Kanai L. Mukherjee<br>Tata Mc. Graw Hill Pub. New Delhi |
| 3. Practical Microbiology :   | Prof. C.P. Baveja<br>Arya Publications, New Delhi       |

### Pathology

#### RATIONALE

In health different body systems and / or parts work normally, however, during disease process, normal structures and functions of body parts may be altered pathology deals with all abnormal changes taking place inside the body during disease.

#### CONTENTS

1. Histopathology
  - General principles of histo-pathological work : Collection of specimen, numbering and giving tissue bits.
  - Equipments used in histopathology, their merits & demerits and care to be taken.
  - Fixatives used in histopathology – Preparation, advantage and disadvantages.
  - Frozen section and cryostat technique, staining and mounting, morbid anatomy.
  - Decalcification – Methods, advantages and disadvantages of each method.
2. Cytology
  - Introduction of cytopathology, methods of collection of materials making smears and preparations of fixatives used.
  - Different stains used, their preparation and staining the smears.
  - Demonstration of barr- Bodies (Sex Chromatin).
3. ....
  - Morbid anatomy
  - Tissue processing – Fixation, dehydration, clearing impregnation in paraffin.

*(Signature)*  
सहायक आचार्य

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- Making of blocks and section cutting, errors in section cutting and their correction.
  - Preparation of different types of haematoxylin and Eosin including staining technique of rapid diagnosis.
  - Haematoxylin and Eosin staining, including staining technique for rapid diagnosis and mounting (Different type of special stains)
  - Preparation of different type of special stains.
  - Special staining techniques.
  - Immuno-histochemical and immuno – cytochemical staining.
4. Hematology
- Investigation of bleeding disorders – Normal coagulation cascade.
  - Bleeding time and clotting time, methods and interpretation.
  - Clot retraction time.
  - Prothrombin time.
  - Activated partial thromboplastin time.
  - Thrombin time
  - Fibrinogen degradation products (FDP)
5. Museum techniques
- Preparation of specimen for mounting.
  - Preparation of fixatives for mounting.
  - Techniques of mounting.
  - Organization of medical laboratory and museum and their maintenance.

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| 1. Medical laboratory manual for tropical Countries Vol I & II                                    | Monica Chesbrough<br>ELBS Edition  |
| 2. Medical laboratory technology A procedure manual for Routine Diagnostic Tests Vol. I, II & III | Kanai L. Mukherjee<br>Tata Mc. Graw Hill Pub. New Delhi  |
| 3. Manual of basic techniques for a health : Laboratory   | WHO Publication, World health Organization, World health house, Indraprastha Estate, Ring Road, New Delhi-110002 |

#### Bio-chemistry

##### RATIONALE

Bio-chemistry imparts knowledge of basic chemical components i.e. carbohydrates, proteins, lipids, vitamins, minerals etc. which are very important for various biochemical reactions going on in human body. Disturbance in various normal biochemical reaction may result during disease process. Therefore, their study helps in diagnosis of disease.

##### CONTENTS

1. Digestion, absorption and assimilation of carbohydrates, blood sugar, regulation of blood sugar glycolysis, TCA, Cycle, glycogenesis, glycogenolysis, GTT, metabolic disease associated with carbohydrate metabolism, diabetes mellitus, glycosylated hemoglobin.
2. Digestion, absorption of proteins, amino acids, urea formation, formation of creatinine, metabolic disorders associated with amino acid metabolism, electrophoretic separation of proteins.
3. Digestion and absorption and assimilation of lipids, ketone, bodies formation metabolic disorders associated with lipids, cholesterol and lipoprotein metabolism.
4. Metabolic disorders associated with nucleic acid metabolism, gout etc.

5. Kidney function tests, urine formation, normal and abnormal constituents.
6. Liver function tests and different type of jaundice.
7. Cardiac profile tests application and significance.
8. Pancreatic enzymes and diagnostic importance.
9. Chemistry of blood, composition and importance of different constituents, hemoglobin ..... biosynthesis, porphyrias.
10. .... and its composition and diagnostic significance.
11. Constituents of gastric juice and diagnostic importance.
12. Principles of special investigation like RIA, ELISA and chemiluminescence.
13. Normal values, normal range, interpretative clinical chemistry, quality controls – internal and external.
14. Automation in clinical investigation – Auto and semi analyzers, continuous flow analyzers, discrete analyzers, batch analyzers random access auto analyzer, dry chemistry analyzers – Reagents kits.
15. Recording of patients date, reporting values, preparation of investigation, statistics.

#### REFERENCE BOOKS

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|--|--|
| 1. Medical laboratory manual for tropical Countries Vol I & II                                       | Monica Chesbrough<br>ELBS Edition  |
| 2. Medical laboratory technology<br>A procedure manual for Routine Diagnostic Tests Vol. I, II & III | Kanai L. Mukherjee<br>Tata Mc. Graw Hill Pub. New Delhi  |
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### Clinical Practical Training – II

#### RATIONALE

Practical training is very essential because it gives detailed practical knowledge regarding various tests of that trainees will be able to judge the importance of the tests in diagnosis of various diseases.

#### CONTENTS

Practical training related to i.e. microbiology including parasitology and immunology, pathology and bio-chemistry.

In II year trainee should be made to associate with senior technicians in conducting all the investigation of the laboratory trainee should be exposed to all sections of the laboratory. The candidate must estimate following, analyses himself glucose, urea, creatinine, uric acid, calcium, phosphorus, iron, TIBC, Total protein, albumin, bilirubin (Direct/Indirect) triglycerides, cholesterol, IDL cholesterol, HDL, cholesterol, SGOT, SGPT, Alkaline phosphatase, acid phosphatase, LDH, CPK, CK-MB, GGT, Electrolytes by Flame..... and ISE, Blood gas analysis, estimation of hormones by ELISA (Insulin, ....., Estimation of GHB.

Biochemical examination of pathological urine.

Biochemical examination of body fluids – CSF, pleural, ascitic fluid.

Candidate must be given practical training in clinical biochemistry lab.

1. Hanging drop preparation
2. Biochemical reaction – Inoculation and interpretation.
3. Antibiotic sensitivity tests.

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## M.L.T. Instruments Practical Lab- II

### RATIONALE

Since the trainee has to work on various laboratory instruments and equipments, he must have the basic knowledge and practical training about the different machines so that in case of any trouble during work, he/she will be able to correct and repair the faults.

### CONTENTS

- Introduction the equipments.
- Simple usage.
- Indication and contraindications use.
- Repair and maintenance of instruments.

### REFERENCE BOOKS

1. Medical laboratory manual for tropical Countries Vol I & II  
Monica Chesbrough  
ELBS Edition
2. Medical laboratory technology  
A procedure manual for Routine  
Diagnostic Tests Vol. I, II & III  
Kanai L. Mukherjee  
Tata Mc. Graw Hill Pub. New Delhi

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