

Shivaji University, Kolhapur



"A" Re accredited by NAAC(2014)
With CGPA 3.16

**Faculty of Interdisciplinary Studies
Structure, Scheme and Syllabus for
Bachelor of Vocation (B. Voc.)**

Advanced Diploma In Medical Laboratory Technology

Part II- Sem. III & IV

(Subject to the modifications that will be made from time to time)
Syllabus to be implemented from, 2021-2022 onwards).

Advanced Diploma– II Semester – III

Sr. No	Paper No.	Title	Theory /Practical/Project	Marks (Total)	Distribution of Marks Theory Practical	
General Education Component :						
1	301	Fundamental of financial Accounting I	Theory /Practical	50	40	10
2	302	Computer Fundamental	Theory/Practical	50	40	10
3	303	Clinical Biochemistry	Theory	50	50	--
4	304	Pathology	Theory	50	50	--
5	305	Immunology	Theory	50	50	--
6	306	Laboratory Work : Clinical Biochemistry	Practical	50	--	50
7	307	Laboratory Work: Pathology	Practical	50	--	50
8	308	Laboratory Work : Immunology	Practical	50	--	50
9	309	Project	-	50	--	50

Advanced Diploma– II Semester –IV

Sr. No.	Paper No.	Title	Theory /Practical /Project	Marks (Total)	Distribution of Marks	
					Theory	Practical
General Education Component :						
1	401	Fundamental of financial Accounting I	Theory /Practical	50	40	10
2	402	Soft Skills & Personality Development	Theory /Practical	50	40	10
Skill Component:						
3	403	Laboratory Management and quality control	Theory	50	50	--
4	404	Clinical Mycology and Virology	Theory	50	50	--
5	405	General Pharmacology and Statistics	Theory	50	50	--
6	406	Laboratory Work : Laboratory Management and quality control	Practical	50	--	50
7	407	Laboratory Work: Clinical Mycology and Virology	Practical	50	--	50
8	408	Laboratory Work: General Pharmacology and Statistics	Practical	50	--	50
9	409	Industrial Visit/Study Tour	-	50	--	50

Scheme of Teaching: Advanced Diploma– Part II Semester – III

Sr. No.	Paper No.	Title	Distribution of Workload (Per Week)		
			Theory	Practical	Total
1	301	Fundamental of Financial Accounting-I	4	2	6
2	302	Computer Fundamental	4	2	6
3	303	Clinical Biochemistry	4	-	4
4	304	Pathology	4	-	4
5	305	Immunology	4	-	4
6	306	Laboratory Work : Clinical Biochemistry	-	4	4
7	307	Laboratory Work: Pathology	-	4	4
8	308	Laboratory Work : Immunology	-	4	4
9	309	Project	-	-	-
			20	16	36

Scheme of Teaching : Advanced Diploma– Part II Semester – IV

Sr. No.	Paper No.	Title	Distribution of Workload (Per Week)		
			Theory	Practical	Total
1	401	Fundamental and Financial accounting-II	4	2	6
2	402	Soft Skills and personality development	4	2	6
3	403	Laboratory Management and quality control	4	-	4
4	404	Clinical Mycology and Virology	4	-	4
5	405	General Pharmacology and Statistics	4	-	4
6	406	Laboratory Work : Laboratory Management and quality control	-	4	4
7	407	Laboratory Work: Clinical Mycology and Virology	-	4	4
8	408	Laboratory Work: General Pharmacology and Statistics	-	4	4
9	409	Industrial Visit/Study Tour	-	-	-
		Total-	20	16	36

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Advanced Diploma in Medical Laboratory Technology
Part-II Semester-III

Paper-301: Fundamental of Financial Accounting-I

Work Load - 6 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Theory - 40 Marks

Practical – 2 Lectures/Week/Batch of 20 student

Practical – 10 Marks

Objective

To impart basic accounting knowledge as applicable to business.

UNIT I INTRODUCTION TO ACCOUNTING

Meaning, nature and advantages of accounting, branches of accounting.

Accounting concepts and conventions, types of accounts.

Rules of journalizing, source documents – cash vouchers, cash memo.

Receipts , debit notes, credit notes.

Paying slips , withdrawals , Cheque

UNIT II JOURNALS & LEDGER

Preparation of journal entries and ledger accounts

Subsidiary books- purchase books, purchase return book, sales book, sales return book, cash book, bills receivable book, bills payable book, journal proper.

UNIT III DEPRECIATION

Meaning,

Methods- straight line method- reducing balance method, change in depreciation method,

UNIT IV FINAL ACCOUNTS

Preparation of trial balance.

Preparation of final accounts of sole traders and partnership firms

Practical's (Based on the above Units) :

1. Preparation of journal entries and ledger account

Preparation of subsidiary books.

1. Preparation of trial balance.

2. Practical problems on final accounts of sole traders and partnership firms.

3. Practical problems on methods of depreciation.

Reference Books.

1. Barry Berman and Joel R . Evans- Retailing management- A Strategic Approach, Prentice Hall of India.
2. James R. Ogden Denise Ogden- Integrated Retail Management- Biztantra.
3. Gibson G. Vedamani- Retail Management- Functional Principle Practices, Jiao Publishing House.
4. Swapna Pradhan- Retailing Management- Text and Cases, Tata McGraw Hill

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Part-II Semester-III

Paper-302: Computer Fundamentals

Work Load - 6 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Theory - 40 Marks

Practical – 2 Lectures/Week/Batch of 20 student

Practical – 10 Marks

Objective

To enable student to develop skill in computer fundamentals.

UNIT I

MS – WORD

File commands, print, page setup.

Editing – cut, copy, paste, find, replace, etc.

Formatting commands – fonts, bullets, borders, columns, tabs, indents.

Tables, auto text, auto correct.

Mail merge.

Hyperlinks.

UNIT II

MS – EXCEL

Features, auto fill, custom lists etc.

Cell reference – relative and absolute(\$)

Formulae, functions (math/stats, text, date, IF)

Charts – types, parts of the chart.

Databases (create, sort, auto filter, sub total)

UNIT III

MS – POWERPOINT

Slide layout.

Clipart, organizational chart, graphs, tables.

Slide Timings.

UNIT IV

INTERNET / E-MAIL

Pre – requisites for internet, role of modem.

Services – emailing, chatting, surfing, blog.

Search engines, browsers, dial up, domains.

Practical's (Based on the above Units) :

1. Handling computer.
2. Handling internet.
3. Handling email.
4. Making power point presentation.

Reference Books.

1. Computer Fundamentals – P.K. Sinha.
2. A First Course In Computers – Sanjay Saxena.
3. DOS Guide – Peter Norton.
4. Mastering MS- OFFICE – Lonnie E.Moseley and David M. Boodey (BPB Publication)
5. Mastering FOXPRO – Charles Siegel (BPB Publication)

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Advanced Diploma in Medical Laboratory Technology
Part-II Semester-III
Paper-303: Clinical Biochemistry

Work Load - 6 Lectures / Week,

Total Marks – 50

Theory – 6 Lectures / Week

Unit I: Introduction and General Aspect

1. Introduction to clinical biochemistry, biochemical test and its application, Application of biochemistry in hospital setting.
2. Elementary knowledge of chemistry- Structure of atoms, atomic weight, molecular weight and equivalent weight.
3. Types of solution- Molar, Normal, Buffer, percentage and standard solution.

Unit II: Clinical Instrumentation: Principle, care, use and Maintenances

1. Balance, Centrifuge, pH meter, colorimeter
2. Spectrophotometer, fluorimeter, photometer, ion selective electrodes.
3. Chromatography and electrophoresis
4. Urinometer and Densitometer

Unit III: Nutritional Disorders

1. Disorder related to carbohydrate metabolism
2. Disorder related to protein and nitrogen metabolism
3. Lipid profile and its significance to various disorder.

Unit IV: Organ Profile

1. Liver function test
2. Kidney function test
3. Thyroid function test
4. Cardiac function test

References:

1. Handbook of Christen Medical Association, India (CMAI) Medical Laboratory Technology- Robert H. Carman. 2nd Edn. CMAI, New Delhi.

2. Handbook of Biochemistry, M. A. Siddique 8th Edn.1993 Vijay Bhagat Scientific Book Co., Patna.
3. Biochemical Techniques, K. Choudhary 1st Edn.1989, Medical Publishers, New Delhi.
6. Clinical Biochemistry, G. Guru 1st Edn.1989, Secretary, National Council of Educational Research & Training, New Delhi

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Part-II Semester-III
Paper-304: Clinical Pathology

Work Load - 6 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Unit I: Introduction to clinical Pathology

1. Samples for clinical examinations
2. Indication, collection, container and preservation of samples.
3. Physical, chemical and Microscopic examination of samples

Unit II Examination of Urine

1. Indication, Collection, Container, Transport, Preservation of urine for different types of urine analysis.
2. Physical Examination of urine and its significance
3. Chemical Examination of urine and its significance
4. Microscopic examination of urine and its significance

Unit III Examination of Stool

1. Indication, Collection, Container, Transport, Preservation of urine for different types of urine analysis.
2. Physical Examination of stool and its significance
3. Chemical Examination of stool and its significance
4. Microscopic examination of stool and its significance

Unit IV Examination of Semen

1. Indication, Collection, Container, Transport, Preservation of urine for different types of urine analysis.
2. Physical Examination of semen and its significance
3. Chemical Examination of semen and its significance
4. Microscopic examination of semen and its significance

References:

1. Medical Laboratory ,Techniques, Vol - I, II & III, K. Mukharji, 5th End., Tata McGraw Hill, Delhi.
2. Pathological Technology : Clinical Pathology, G. Guru, 1st End 1998, Sec - National Council of Educational Research & Training, New Delhi.
3. Clinical pathology, S. S. Kelkar, 1st End 1993, Vora medical Publications, Mumbai.
4. Gardwohl's Clinical Laboratory Methods & Diagnosis - Vol - I & II, A. C. Sonnenwirth & Leonard Jarett, 8th End 1980, C. V. Mosby Co., USA.
5. Clinical Diagnosis & Management by Laboratory Methods, J. Bernard Henry, 17th End 1984, W. B.

Saunders Co., London.

6. Text Book of Medical Laboratory Technology, P.B. Godkar, 2nd End 2003, Bhalani Publication.

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Part-II Semester-III
Paper-305: Immunology

Work Load - 6 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 6 Lectures / Week

Unit I: Introduction to Immunology

1. Types of immunity: nonspecific physiological and cellular barriers
2. Acquired immunity- characteristics
3. Antigen, Haptens and Adjuvants, Antibody
4. Structure and types of immunoglobulins.

Unit II: Cells and Organs of Immune system

1. Organs of immune system – primary and secondary
2. Cells of immune system
3. Humoral Immune response
4. Cell mediated immune response
5. MHC structure and function
6. Autoimmunity

Unit III: Immuno-techniques

1. Introduction to Antigen-antibody interactions
2. Affinity, avidity, cross reactivity, Precipitation reaction
3. Radial immune diffusion, Ouchterlony double diffusion
4. Complement fixation
5. ELISA

Unit IV: Clinical Immunology

1. Blood groups and blood grouping. A, B, Rh antigens and antibodies, Rh typing. Bombay group
2. Immunization: Passive and active
3. Vaccines- types and applications
4. Hybridoma technology, Polyclonal antibodies and monoclonal antibodies.

References:

1. Ivan M. Roitt and Peter J delves, Essential Immunology, Blackwell Publishing
2. Helen Chappel and Mansel Haeney, Essential Clinical Immunology, ELBS/Blackwell Scientific Publications
3. John W, Kimball Maxwell, Introduction to Immunology, Mac Millan International Edition

4. Thomas J. Kindt, Barbara A. Osborne, Richard A. Goldsby, and Janis Kuby, Immunology, W H Freeman and Co.
5. Charles A. Janeway Jr., Paul Travers, Mark Walport and Mark J. Shlomchik, Immunobiology, Garland Publishing.
6. Chapel H and Halbey M, Essentials of Clinical Immunology. ELBS. 1986.
7. Pravash Sen. Gupta, Clinical Immunology. Oxford University Press. 2003.

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Part-II Semester-III

Paper-306: Laboratory Work: Clinical Biochemistry

Work Load - 4 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Objectives of practical's:

1. Principal and working of clinical laboratory instruments.
2. Preparation and standardization of volumetric solutions.
3. Basic titrations acid Vs alkali
4. Preparation of buffer solution.
5. Measurement of solution pH.
6. Estimation of serum transaminase (SGOT and SGPT)
7. Estimation of serum acid phosphatase
8. Estimation of serum alkaline phosphatase.

References:

1. G. Guru, Clinical Biochemistry, 1st Edn 1989, Secretary, National Council of Educational Research & Training, New Delhi.
2. Handbook of Biochemistry, M. A. Siddique 8th Edn.1993 Vijay Bhagat Scientific Book Co., Patna.
3. Cunningham's Manual of Practical Anatomy, 15th Edn 1986, ELBS, Oxford University.
4. Text book of Medical Biochemistry, S. Ramkrishnan, 1st End 1980, Orient Longman Ltd., Madras.
5. Text book of Medical Laboratory Technology, P.B. Godkar, 2nd End 2003, Bhalani Publication.

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Part-II Semester-III

Paper-307: Laboratory Work: Clinical Pathology

Work Load - 4 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Objectives of practical's:

1. To study types of samples for clinical examination.
2. To study methods and preservations of clinical samples.
3. Clinical characterization of sample
4. Physical characterization of sample
5. Chemical characterization of sample
6. Routine examination of urine
7. Routine examination of stool
8. Routine examination of semen

References:

1. Medical Laboratory ,Techniques, Vol - I, II & III, K. Mukharji, 5th End., Tata McGraw Hill, Delhi.
2. Pathological Technology : Clinical Pathology, G. Guru, 1st End 1998, Sec - National Council of Educational Research & Training, New Delhi.
3. Clinical pathology, S. S. Kelkar, 1st End 1993, Vora medical Publications, Mumbai.
4. Gardwohl's Clinical Laboratory Methods & Diagnosis - Vol - I & II, A. C. Sonnenwirth & Leonard Jarett, 8th End 1980, C. V. Mosby Co., USA.
5. Clinical Diagnosis & Management by Laboratory Methods, J. Bernard Henry, 17th End 1984, W. B. Saunders Co., London.
6. Text Book of Medical Laboratory Technology, P.B. Godkar, 2nd End 2003, Bhalani Publication.

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Part-II Semester-III

Paper-308: Laboratory Work: Immunology

Work Load - 4 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Objectives of practical's:

1. Identification of various immune cells by morphology – Leishman staining.
2. Differential counts of leucocytes.
3. Identify blood groups and types.
4. Antibiotic sensitivity test.
5. Latex agglutination tests
6. Enzyme linked immunosorbant assay
7. Performance of serological Widal test.
8. Analyze the components of human sera.

References:

1. Immunology - An outline for students of medicine , D. M. Weir ,5 th Edinburgh, Churchil Livingston.
2. A Hand book of Practical Immunology, G. P. Talwar, 1 st Edn. Vikas Publishing House.
3. Serology for Medical Laboratory Students, G. Guru, 1st Edn. NCERT, NewDelhi.
4. Serology, Tulip Dignostic Syphillis, 1st Edn. Tulip Dignostic, Germany.
5. Noel R. Rose, Herman Friedman, John L. Fahey. Manual of Clinical Laboratory Immunology.ASM. 3rd ed., 1986.

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Part-II Semester-III

Paper-309: Industrial Visit or Study Tour

Work Load - 4 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Objectives of practical's:

1. Visit to pathological Laboratory
2. Introduction to different laboratory instruments, its structure and function.
3. Collection of data regarding patient's blood investigations.
4. Observation of laboratory procedures

References:

1. Nanda Maheshwari, Clinical Pathology Hematology and Blood banking
2. R. P. Jayaswal, Basics of Medical Laboratory Science
3. P. Deshmukh, Principle of Good Laboratory Practice
4. Drew Provan, Oxford handbook of Clinical and Laboratory Investigation.

Shivaji University Kolhapur
Diploma in Medical Laboratory Technology
Part-II Semester-IV

Paper-401: Fundamental of financial Accounting- II

Work Load - 6 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Theory - 40 Marks

Practical – 2 Lectures/Week/Batch of 20 student

Practical – 10 Marks

Objective :

To impart basic accounting knowledge as applicable to business.

UNIT I COMPUTERIZED ACCOUNTING SYSTEM

Introduction.

Concept, components , features.

Importance and utilization of computerized accounting system.

UNIT II COMPUTER APPLICATION THROUGH ACCOUNTING PACKAGE TALLY

Creation of company, group, ledger accounts, feeding of accounting data, receipts, payments, purchase, sales, contra, journal, credit note & debit note.

Inventory information – groups, items & valuation.

Generation of various accounting reports.

UNIT III ACCOUNTS OF PROFESSIONALS

Preparation of receipts and payment account.

Income and expenditure account and balance sheets of non profit organization.

UNIT IV SINGLE ENTRY SYSTEM

4.1 Conversion of single entry system into double entry system.

Practicals (Based on the above Units) :

1. Understanding computerized accounting practices applied in different retail maiis in &around kolhapur city.
2. Practical problems based on computerized accounting using tally.
 - 3 Practical problems on preparation of receipts and payment account.
4. Preparation of income and expenditure account and balance sheet of non- profit making organizations.

Reference Books.

1. Theory and Practice of Computer Accounting, Rajan Chaugule and Dhaval Chaugule.
2. Advanced Accountancy, S.C. Jain and K.L. Narang.
3. Advanced Accountancy, M.C. Shukla and T.S. Garewal.
4. Advanced Accountancy, S.N.Maheshwari.

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Part-II Semester-IV

Paper-402: Soft skills and personality development

Work Load - 6 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Theory - 40 Marks

Practical – 2 Lectures/Week/Batch of 20 student

Practical – 10 Marks

Objective

To enable student to develop skills & personality development

UNIT I PERSONAL SKILLS

Knowing oneself.

Confidence building.

Defining strengths.

Thinking creatively personal values.

Time and stress management.

UNIT II SOCIAL SKILLS

Appropriate and contextual use of language.

Non verbal communication, interpersonal skills.

Problem solving.

UNIT III PERSONALITY DEVELOPMENT

Personal grooming and business etiquettes, corporate etiquette, social etiquett& telephone etiquette.

Role play and body language.

UNIT IV PRESENTATION SKILLS

Group discussion.

Mock group discussion using video recording.

Public speaking.

Professional etiquettes.

Practical's (Based on the above Units) :

1. Developing the personality.
2. Group discussion.
3. Body language and personal antiques.
4. Public speaking.
5. Handling the guest.

Reference Books.

1. Matila Treece, Successful Communication : Allemande Bacon, Pubharkat.
2. Robert T. Reilly, Effective Communication in Tourist and Travel Industry, Dilnas Publication.
3. Boves, Thill, Business Communication Today, Mcycans Hills Publication.

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Advanced Diploma in Medical Laboratory Technology
Part-II Semester-IV

Paper-403: Laboratory Management and Quality Control

Work Load - 6 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 6 Lectures / Week

Unit I: Laboratory Set up

1. Introduction and planning - Role of laboratory in human health and diseases
2. Human diseases and methods of diagnosis
3. Laboratory at different level (National / State /District)
4. Duties and responsibilities of laboratory personnel
5. Designing of laboratory sections

Unit II: Laboratory Management

1. Inspect equipment, structures, or materials to identify the cause of errors or other problems or defects.
2. Deal with people at junior levels to effectively direct their work towards optimum output.
3. The principles of leadership and guidance
4. Team Work- Decision making(Decide which tasks to assign to junior Technicians and other medical laboratory workers on their teams

Unit III: Medico Legal Aspects of Laboratory Maintenance

1. Definition of ethics - principles of Bio ethics
2. Ethics of laboratory practice, confidentiality of reports.
3. Records & Reports - Importance of Records and Reports
4. Medico legal aspects of record keeping

Unit IV: Laboratory Quality control and quality assurance

1. Internal and external quality control programmes.
2. Anticipating demand and ensuring availability of adequate medical and diagnostic supplies(Guidelines on anticipating demand for medical and diagnostic supplies

3. Contents of all diagnostic and medical kits, Guidelines on procurement and storage of medical and diagnostic kits)

References:

1. Robert H. Carman, Handbook of Christian Medical Association, India (CMAI) Medical Laboratory Technology-. 2nd Ed. CMAI, New Delhi.
2. G. Guru, Laboratory Setup & Procedures, 1st Edn. 1989 NCERT, New Delhi
3. WHO, Geneva Biosafety Manual for laboratories, 2nd Edn. 1993 . WHO Publication, Geneva.
4. P.B. Godkar (2003) Text book of Medical Laboratory Technology, 2nd Ed. Bhalani Publication.

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Part-II Semester-IV

Paper-404: Clinical Mycology and Virology

Work Load - 6 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 6 Lectures / Week

Unit I: Introduction to mycology

1. Morphology and classification of pathogenic fungi
2. Morphology and laboratory diagnosis of fungi causing superficial mycosis
3. Morphology and laboratory diagnosis of fungi causing deep mycosis.

Unit II: Clinical Mycology

1. Morphology and laboratory diagnosis of fungi causing systemic mycosis
2. Morphology and laboratory diagnosis of fungi causing opportunistic fungal infections.

Unit III: Introduction to Virology

1. Classification, general properties of viruses
2. Cultivation and propagation of human viruses
3. Bacteriophage and its significance

Unit IV: Clinical Virology

1. Morphology, pathogenicity and laboratory diagnosis of hepatitis viruses
2. Morphology, pathogenicity and laboratory diagnosis of HIV / AIDS virus.
3. Oncogenic viruses

References:

1. Webster J, Weber R.W.S. 2007. Introduction to Fungi. Cambridge University Press.
2. Stevens, R. B. 1974. Mycology Guidebook. University of Washington Press, Seattle.
3. Hawksworth D. L. 1974. Mycologist's Handbook. Commonwealth Mycological Institute. Kew.
4. Medical Microbiology -Vol.I & II, Mackie-McCartney, 3thEdn. ELBS, Churchill Livingstone .
5. Medical Microbiology- Earnest Jawetz , 18th Edn. Prentice – Hall International Inc –

USA.

6. Mycology for clinical Laboratory, G. M. More & D. M. Jacio, 1st End 1979, Reston Publishing co., USA.
7. Medical Virology, D. O. White & F. Fenner, 3rd 1986, New York Academic Press, N. Y.
8. Text book of Human Virology, R. B. Bleshe, et. al, 2nd 1991, St. Louis Mosby, Year Book.

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Part-II Semester-IV

Paper-405: General Pharmacology and statistics

Work Load - 6 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 6 Lectures / Week

Unit I: Introduction to pharmacology

1. Definition and different branches of pharmacology
2. Drug and Drug nomenclature
3. Route of drugs administration
4. Concept of Pharmacokinetics
5. Pharmaco-dynamics and Adverse during action

Unit II: Drugs for the diseases of fundamental System

1. GI System.
2. Respiratory System.
3. Cardiovascular System.
4. Blood, Blood Coagulation, Thrombosis, different types of anti-coagulants.
5. Drugs affecting the Urine and renal functions, excretion of drugs in stool, bile and other body fluids.

Unit III: General statistics

1. Types and classification of data
2. Tabulation
3. Measures of central tendency: Mean, Mode, Median.

Unit IV: Measure of dispersion and test of significance

1. Range
2. Standard deviation
3. Standard error and types
4. 't' test

References:

1. Fundamentals of experimental Pharmacology by Dr. M.N. Ghosh
2. Pharmacology & Pharmacotherapeutics by Satoskar (RS)
3. Essentials of Medical Pharmacology by Tripathi (KD).
4. Pharmacology by Rang (HP).

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Part-II Semester-IV
Paper-406: Laboratory Work: Laboratory Management and quality control

Work Load - 4 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Objectives of practical's:

1. Bio safety Precautions and Guidelines
2. Preparation of various reagents.
3. Responsibilities of a technician in the maintenance
4. Designs and sections of laboratory
5. National, state and district level of laboratory
6. Preparation of laboratory report
7. Internal quality control program.
8. External quality control program

References:

1. Laboratory quality management system: Handbook, by world health organization, clinical and laboratory standard institute
2. Laboratory quality management by George S. Cembrowski and R. Neill Carey, 1989.

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Part-II Semester-IV

Paper-407: Laboratory Work: Clinical Mycology and Virology

Work Load - 4 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Objectives of practical's:

1. Collection and processing of skin scrapings / nail clippings / hair pieces / clinical material for demonstration of fungal elements
2. Microscopy for fungal elements : unstained preparation : Lactophenol cotton blue.
3. Microscopy for fungal elements : stained preparation
4. Demonstration of common fungal media with and without growth
5. Instruments / Equipment's and glassware used in viral diagnostic laboratory.
6. Inoculation of chick-embryo and other cell / tissue culture media.

(Practicals will be conducted with the help of audio, video-aids or by paying visit to virus culture laboratory).

References:

1. Stevens, R. B. 1974. Mycology Guidebook. University of Washington Press, Seattle.
2. Hawksworth D. L. 1974. Mycologist's Handbook. Commonwealth.
3. Medical Mycology, J. W. Rippon, 3rd Ed 1988, W. B. Saunders Co., London.
4. Mycology for clinical Laboratory, G. M. More & D. M. Jacio, 1st Ed 1979, Reston Publishing co., USA.
5. Medical Virology, D. O. White & F. Fenner, 3rd 1986, New York Academic Press, N. Y.
6. Text book of Human Virology, R. B. Blakeslee, et. al, 2nd 1991, St. Louis Mosby, Year Book

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Part-II Semester-IV

Paper-408: Laboratory Work: Pharmacology and Statistics

Work Load - 4 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Objectives of practical's:

1. Study of common anticoagulants.
2. Study of common antifungal drugs.
3. Study of common antibiotics.
4. Study of common disease related to respiratory diseases.
5. Stastical example based on tabulation.
6. Stastical example based on measure of central tendency.
7. Stastical example based on Standard deviation
8. Stastical example based on t test.

References:

1. Pharmacology & Pharmacotherapeutics by Satoskar (RS)
2. Essentials of Medical Pharmacology by Tripathi (KD).
3. Pharmacology by Rang (HP)
4. A Text Book of Biostatics A.K. Sharma ; Publisher, Discovery Publishing House, 2005 ; ISBN, 818356030X.

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Part-II Semester-IV

Advanced Paper-409: Laboratory Work: Industrial Visit or Study Tour

Work Load - 4 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Objectives of practical's :

1. Visit to pathological Laboratory
2. Introduction to different laboratory instruments, its structure and function.
3. Collection of data regarding patient's blood investigations.
4. Observation of laboratory procedures

References:

1. Nanda Maheshwari, Clinical Pathology Hematology and Blood banking
2. R. P. Jayaswal, Basics of Medical Laboratory Science
3. P. Deshmukh, Principle of Good Laboratory Practice
4. Drew Provan, Oxford handbook of Clinical and Laboratory Investigation.