

# 3-4-343, Barkathpura, Hyderabad - 500 027 (T.S), India
Office: +91 40-27563065, Mobile: +91 9848930555

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EAMCET Code: RBVW | PGECET Code: RBVW1

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# Courses list of Professional Ethics, Gender, Human Values, Environment and Sustainability

S. No	Subject Name	Subject Code	Course & Year	Cross Cutting Issue
1.	Communication Skills	BP 105T	B. Pharm I Sem	Human Values Professional Ethics
2.	Human Anatomy and Physiology I & II	BP 107P BP 201T 1.1	B. Pharm I &II Sem Pharm D I	Gender Equity
3.	Environmental Sciences	BP 206T	B Pharm II Sem	Environmental & Sustainability
4.	Community Pharmacy	2.5	Pharm D II	Professional Ethics Human Values Gender Equity
5.	Pharmacognosy & Phytochemistry	BP 405T 2.3	B Pharm IV Sem	Environment & Sustainability
6.	Herbal Drug Technology	BP 603T	B Pharm VI Sem	Environment & Sustainability
7.	Quality Assurance	BP 606T	B Pharm VI Sem	Professional Ethics
8.	Industrial Pharmacy I &II	BP 502T BP 702T	B Pharm V &VII Sem	Professional Ethics Environment Sustainability
9.	Social and Preventive Pharmacy	BP 802T	B Pharm VIII Sem	Professional Ethics Human Values
10.	Clinical Pharmacy	4.3	Pharm D IV	Professional Ethics Human Values
11.	Hospital Pharmcay	4.2	Pharm D IV	Professional Ethics Human Values
12.	Pharmacoepidemiology & Pharmacoeconomics	5.2	Pharm D V	Professional Ethics Human Values
13.	Pharmacotherapeutics- I, II & III	2.6, 3.3 & 4.1	Pharm D II,III & IV	Professional Ethics Human Values Gender Equity
14.	Biochemistry	BP 203T	B Pharm II Sem	Professional Ethics Human Values Gender Equity
15.	Medicinal Biochemistry	1.3	Pharm D I	Professional Ethics Human Values Gender Equity

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				Professional Ethics
16.	Computer Applications	BP 205T	B Pharm II Sem	Environmental &
10.	compater Applications	D. 2031	B i iidiiii ii seiii	Sustainability
	Pharmaceutical			Human Values
17.	Microbiology	BP 303T	B Pharm III Sem	Gender Equity
	iviici esi ei egy			Professional Ethics,
18.	Pharmaceutical Engineering	BP 304T	B Pharm III Sem	Environmental &
10.	Tharmaceutical Engineering	Bi 3041	D I Halli III Scili	Sustainability
				•
10	Pharmaceutical	DD 605 T	D.D.I	Professional Ethics,
19.	Biotechnology	BP 605 T	B Pharm VI Sem	Environmental &
	<i>-</i>			Sustainability
_				Professional Ethics
20.	Pharmacy Practice	BP 703 T	B Pharm VII Sem	Human Values Gender
				Equity
	Biostatistics and Research			Professional Ethics
21.	Methodology	BP 801 T	B Pharm VII Sem	Human Values Gender
				Equity
22.	Pharma Marketing	BP 803 ET	B Pharm VII Sem	Professional Ethics Human
22.	Management	DF 603 L1	b Filailli VII Selli	Values
	Pharmaceutical Regulatory			Professional Ethics Human
23.	Sciences	BP 804 ET	B Pharm VII Sem	Values
			B Pharm VII	
24.	Pharmacovigilance	BP 805 ET	Sem	Professional Ethics
			B Pharm VII Sem	Drofossional Ethics
25.	Computer Aided Drug Design	BP 807 ET	& Pharm vii Sem	Professional Ethics, Environmental &
25.		& MPC 203 T	M Pharm II Sem	Sustainability
			IVI PIIAITII II SEITI	
26	Pharmaceutical			Professional Ethics Human
26.	Jurisprudence	BP 505 T	B Pharm V Sem	Values
				Gender Equity
2=	Pharmaceutical	2.1	DI D	Professional Ethics Human
27.	Jurisprudence	3.4	Pharm D III	Values
				Gender Equity
20	Cellular & molecular	MPL 104 T	M Pharm I Sem	Professional Ethics Human
28.	Pharmacology			Values
				Gender Equity



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#### LIST OF COURSES ADDRESSING PROFESSIONAL ETHIC

S No	Name of the Course
1	3.4 Pharmaceutical Jurisprudence (Theory) Pharm D 3 <sup>rd</sup> Year
2	4.2 Hospital Pharmacy (Theory)
3	4.2 Hospital Pharmacy (Practical)
4	BP 505 T. Pharmaceutical Jurisprudence (Theory)
5	BP 606 T Pharmaceutical Quality Assurance (Theory)
6	BP 805 T Pharmacovigilance (Theory)

#### 3.4 PHARMACEUTICAL JURISPRUDENCE (THEORY)

Theory: 2 Hrs. /Week

- Scope of the Subject: (4-6 lines): This course exposes the student to several important legislations related to the profession of pharmacy in India. The Drugs and Cosmetics Act, along with its amendments are the core of this course. Other acts, which are covered, include the Pharmacy Act, dangerous drugs, medicinal and toilet preparation Act etc. Besides this the new drug policy, professional ethics, DPCO, patent and design Act will be discussed.
- 2. Objectives of the Subject: Upon completion of the subject student shall be able to (Know, do, and appreciate)

  - a. practice the Professional ethics;
     b. understand the various concepts of the pharmaceutical legislation in India;
  - know the various parameters in the Drug and Cosmetic Act and rules;
     know the Drug policy, DPCO, Patent and design act;

  - understand the labeling requirements and packaging guidelines for drugs and f be able to understand the concepts of Dangerous Drugs Act, Pharmacy Act and Excise
  - duties Act; and other laws as prescribed by the Pharmacy Council of India from time to time including International Laws.

Text books (Theory) Mithal , B M. Textbook of Forensic Pharmacy. Calcutta :National; 1988

#### Reference books (Theory)

- Singh, KK, editor. Beotra's the Laws of Drugs, Medicines & cosmetics. Allahabad: Law Book House; 1984.
- Jain, NK. A Textbook of forensic pharmacy. Delhi: Vallabh prakashan; 1995.
- Reports of the Pharmaceutical enquiry Committee
- d. I.D.M.A., Mumbai. DPCO 1995
   e. Various reports of Amendments.
- Deshapande, S.W. The drugs and magic remedies act 1954 and rules 1955. Mumbai: Susmit Publications; 1998.
- g. Eastern Book Company .The narcotic and psychotropic substances act 1985, Lucknow: Eastern; 1987.
- 3. Detailed syllabus and lecture wise schedule:

#### Title of the topic

- Pharmaceutical Legislations A brief review
- Principle and Significance of professional ethics. Critical study of the code of pharmaceutical ethics drafted by PCI.

Drugs and Cosmetics Act, 1940, and its rules 1945.

Objectives, Legal definition, Study of Schedule's with reference to Schedule B, C&C1, D, E1, F&F1, F2, F3, FF, G, H, J, K, M, N, P, R, V, W, X, Y. Sales, Import, labeling and packaging of Drugs And Cosmetics Provisions Relating to Indigenous Systems.

Constitution and Functions of DTAB, DCC, CDL.

Qualification and duties –Govt. analyst and Drugs Inspector.

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### 4.2 HOSPITAL PHARMACY (THEORY)

Theory: 2 Hrs. /Week

- Scope: In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug dispensing, manufacturing of parenteral preparations, drug information, patient counselling, and therapeutic drug monitoring for improved patient care.
- 2. Objectives: Upon completion of the course, the student shall be able to -
  - a. know various drug distribution methods;
  - b. know the professional practice management skills in hospital pharmacies;
  - c. provide unbiased drug information to the doctors;
  - d. know the manufacturing practices of various formulations in hospital set up;
  - e. appreciate the practice based research methods; and
  - f. appreciate the stores management and inventory control.

#### Text books: (latest editions)

- a. Hospital pharmacy by William .E. Hassan
- b. A text book of Hospital Pharmacyby S.H.Merchant & Dr. J.S. Qadry. Revised by R.K.Goyal & R.K. Parikh

#### References:

- WHO consultative group report.
- b. R.P.S. Vol.2. Part -B; Pharmacy Practice section.
- Handbook of pharmacy health care. Edt. Robin J Harman. The Pharmaceutical press.
- 3. Lecture wise programme :

#### Topics

- 1 Hospital its Organisation and functions
- 2 Hospital pharmacy-Organisation and management
  - a) Organizational structure-Staff, Infrastructure & work load statistics
  - b) Management of materials and finance
  - c) Roles & responsibilities of hospital pharmacist
- 3 The Budget Preparation and implementation
- 4 Hospital drug policy
  - a) Pharmacy and Therapeutic committee (PTC)
  - b) Hospital formulary
  - c) Hospital committees
    - Infection committee
    - Research and ethical committee
  - d) developing therapeutic guidelines
  - e) Hospital pharmacy communication Newsletter

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### 5 Hospital pharmacy services

- a) Procurement & warehousing of drugs and Pharmaceuticals
- b) Inventory control
  - Definition, various methods of Inventory Control ABC, VED, EOQ, Lead time, safety stock
- c) Drug distribution in the hospital
  - Individual prescription method
  - ii) Floor stock method
  - iii) Unit dose drug distribution method
- d) Distribution of Narcotic and other controlled substances
- e) Central sterile supply services Role of pharmacist

#### 6 Manufacture of Pharmaceutical preparations

- a) Sterile formulations large and small volume parenterals
- b) Manufacture of Ointments, Liquids, and creams
- Manufacturing of Tablets, granules, capsules, and powders
- d) Total parenteral nutrition

# 7 Continuing professional development programs Education and training

- 8 Radio Pharmaceuticals Handling and packaging
- 9 Professional Relations and practices of hospital pharmacist

### 4.2 HOSPITAL PHARMACY (PRACTICAL)

#### Practical: 3 Hrs./Week

- Assessment of drug interactions in the given prescriptions
- Manufacture of parenteral formulations, powders.
- 3. Drug information queries.
- 4. Inventory control

#### List of Assignments:

- Design and Management of Hospital pharmacy department for a 300 bedded hospital.
- 2. Pharmacy and Therapeutics committee Organization, functions, and limitations.
- Development of a hospital formulary for 300 bedded teaching hospital
- Preparation of ABC analysis of drugs sold in one month from the pharmacy.
- 5. Different phases of clinical trials with elements to be evaluated.
- Various sources of drug information and systematic approach to provide unbiased drug information.
- Evaluation of prescriptions generated in hospital for drug interactions and find out the suitable management.

#### Special requirements:

- Each college should sign MoU with nearby local hospital having minimum 150 beds for providing necessary training to the students' on hospital pharmacy activities.
- 2. Well equipped with various resources of drug information.

# Scheme of Practical Examination:

	Sessionals	Annual	
Synopsis	05	15	
Major Experiment	10	25	
Minor Experiment	03	15	
Viva	02	15	
Max Marks	20	70	
Duration	03hrs	04hrs	

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance). y. s-kantu



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### BP 505 T. PHARMACEUTICAL JURISPRUDENCE (Theory)

45 Hours

Scope: This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy in India.

Objectives: Upon completion of the course, the student shall be able to understand:

- 1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
- 2. Various Indian pharmaceutical Acts and Laws
- The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
- The code of ethics during the pharmaceutical practice

Course Content:

UNIT-I 10 Hours

Drugs and Cosmetics Act, 1940 and its rules 1945:

Objectives, Definitions, Legal definitions of schedules to the Act and Rules

Import of drugs - Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties.

Manufacture of drugs - Prohibition of manufacture and sale of certain drugs,

Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license.

UNIT-II 10 Hours

Drugs and Cosmetics Act, 1940 and its rules 1945.

Detailed study of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA)

Sale of Drugs - Wholesale, Retail sale and Restricted license. Offences and penalties

Labeling & Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties.

Administration of the Act and Rules - Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors

UNIT-III 10 Hours

· Pharmacy Act -1948: Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils; constitution and functions, Registration of Pharmacists, Offences and

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Penalties

- Medicinal and Toilet Preparation Act –1955: Objectives, Definitions, Licensing, Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties.
- Narcotic Drugs and Psychotropic substances Act-1985 and Rules: Objectives, Definitions, Authorities and Officers, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, Offences and Penalties

UNIT-IV 08 Hours

- Study of Salient Features of Drugs and Magic Remedies Act and its rules: Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties
- Prevention of Cruelty to animals Act-1960: Objectives, Definitions, Institutional Animal Ethics Committee, CPCSEA guidelines for Breeding and Stocking of Animals, Performance of Experiments, Transfer and acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties
- National Pharmaceutical Pricing Authority: Drugs Price Control Order (DPCO)-2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM)

UNIT-V 07 Hours

- Pharmaceutical Legislations A brief review, Introduction, Study of drugs enquiry committee, Health survey and development committee, Hathi committee and Mudaliar committee
- Code of Pharmaceutical ethics D efinition, Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath
- Medical Termination of Pregnancy Act
- Right to Information Act
- Introduction to Intellectual Property Rights (IPR)

Recommended books: (Latest Edition)

1. Forensic Pharmacy by B. Suresh

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#### BP606TPHARMACEUTICAL QUALITY ASSURANCE (Theory)

45 Hours

Scope: This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important aspects like cGMP, QC tests, documentation, quality certifications and regulatory affairs.

Objectives: Upon completion of the course student shall be able to:

- · understand the cGMP aspects in a pharmaceutical industry
- · appreciate the importance of documentation
- understand the scope of quality certifications applicable to pharmaceutical industries
- understand the responsibilities of QA & QC departments

#### Course content:

UNIT - I 10 Hours

Quality Assurance and Quality Management concepts: Definition and concept of Quality control, Quality assurance and GMP

Total Quality Management (TQM): Definition, elements, philosophies

ICH Guidelines: purpose, participants, process of harmonization, Brief overview of QSEM, with special emphasis on Q-series guidelines, ICH stability testing guidelines

Quality by design (QbD): Definition, overview, elements of QbD program, tools ISO 9000 & ISO14000: Overview, Benefits, Elements, steps for registration

NABL accreditation: Principles and procedures

UNIT - II 10 Hours

Organization and personnel: Personnel responsibilities, training, hygiene and personal records. Premises: Design, construction and plant layout, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination.

Equipments and raw materials: Equipment selection, purchase specifications, maintenance, purchase specifications and maintenance of stores for raw materials.

UNIT – III 10 Hours

Quality Control: Quality control test for containers, rubber closures and secondary packing

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materials.

Good Laboratory Practices: General Provisions, Organization and Personnel, Facilities, Equipment, Testing Facilities Operation, Test and Control Articles, Protocol for Conduct of a Nonclinical Laboratory Study, Records and Reports, Disqualification of Testing Facilities

UNIT – IV 08 Hours

Complaints: Complaints and evaluation of complaints, Handling of return good, recalling and waste disposal.

Document maintenance in pharmaceutical industry: Batch Formula Record, Master Formula Record, SOP, Quality audit, Quality Review and Quality documentation, Reports and documents, distribution records.

UNIT - V 07 Hours

Calibration and Validation: Introduction, definition and general principles of calibration, qualification and validation, importance and scope of validation, types of validation, validation master plan. Calibration of pH meter, Qualification of UV-Visible spectrophotometer, General principles of Analytical method Validation.

Warehousing: Good warehousing practice, materials management

# Recommended Books: (Latest Edition)

- 1. Quality Assurance Guide by organization of Pharmaceutical Products of India.
- Good Laboratory Practice Regulations, 2<sup>nd</sup> Edition, Sandy Weinberg Vol. 69.
- Quality Assurance of Pharmaceuticals- A compendium of Guide lines and Related materials Vol I WHO Publications.
- A guide to Total Quality Management- Kushik Maitra and Sedhan K Ghosh
- 5. How to Practice GMP's P P Sharma.
- 6. ISO 9000 and Total Quality Management Sadhank G Ghosh
- The International Pharmacopoeia Vol I, II, III, IV- General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excipients and Dosage forms
- Good laboratory Practices Marcel Deckker Series
- 9. ICH guidelines, ISO 9000 and 14000 guidelines

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### BP 805T: PHARMACOVIGILANCE (Theory)

45 hours

Scope: This paper will provide an opportunity for the student to learn about development of pharmacovigilance as a science, basic terminologies used in pharmacovigilance, global scenario of Pharmacovigilance, train students on establishing pharmacovigilance programme in an organization, various methods that can be used to generate safety data and signal detection. This paper also develops the skills of classifying drugs, diseases and adverse drug reactions.

#### Objectives:

At completion of this paper it is expected that students will be able to (know, do, and appreciate):

- 1. Why drug safety monitoring is important?
- 2. History and development of pharmacovigilance
- 3. National and international scenario of pharmacovigilance
- Dictionaries, coding and terminologies used in pharmacovigilance
- Detection of new adverse drug reactions and their assessment
- International standards for classification of diseases and drugs
- 7. Adverse drug reaction reporting systems and communication in pharmacovigilance
- Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle
- 9. Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation
- 10. Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India
- 11. ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning
- CIOMS requirements for ADR reporting
- Writing case narratives of adverse events and their quality.

#### Course Content

Unit I 10 Hours

#### Introduction to Pharmacovigilance

- · History and development of Pharmacovigilance
- Importance of safety monitoring of Medicine
- WHO international drug monitoring programme
- Pharmacovigilance Program of India(PvPI)

### Introduction to adverse drug reactions

- Definitions and classification of ADRs
- Detection and reporting
- · Methods in Causality assessment
- Severity and seriousness assessment
- Predictability and preventability assessment
- Management of adverse drug reactions

Basic terminologies used in pharmacovigilance

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- Terminologies of adverse medication related events
- Regulatory terminologies

Unit II 10 hours

#### Drug and disease classification

- Anatomical, therapeutic and chemical classification of drugs
- International classification of diseases
- Daily defined doses
- International Non proprietary Names for drugs

### Drug dictionaries and coding in pharmacovigilance

- WHO adverse reaction terminologies
- MedDRA and Standardised MedDRA queries
- WHO drug dictionary
- Eudravigilance medicinal product dictionary

#### Information resources in pharmacovigilance

- Basic drug information resources
- Specialised resources for ADRs

### Establishing pharmacovigilance programme

- Establishing in a hospital
- Establishment & operation of drug safety department in industry
- Contract Research Organisations (CROs)
- Establishing a national programme

Unit III 10 Hours

### Vaccine safety surveillance

- Vaccine Pharmacovigilance
- Vaccination failure
- · Adverse events following immunization

# Pharmacovigilance methods

- Passive surveillance Spontaneous reports and case series
- Stimulated reporting
- Active surveillance Sentinel sites, drug event monitoring and registries
- Comparative observational studies Cross sectional study, case control study and cohort study
- Targeted clinical investigations

### Communication in pharmacovigilance

- Effective communication in Pharmacovigilance
- · Communication in Drug Safety Crisis management
- Communicating with Regulatory Agencies, Business Partners, Healthcare facilities & Media

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Unit IV 8 Hours

#### Safety data generation

- Pre clinical phase
- Clinical phase
- Post approval phase (PMS)

#### ICH Guidelines for Pharmacovigilance

- · Organization and objectives of ICH
- Expedited reporting
- Individual case safety reports
- Periodic safety update reports
- Post approval expedited reporting
- Pharmacovigilance planning
- Good clinical practice in pharmacovigilance studies

Unit V 7 hours

#### Pharmacogenomics of adverse drug reactions

· Genetics related ADR with example focusing PK parameters.

#### Drug safety evaluation in special population

- Paediatrics
- Pregnancy and lactation
- Geriatrics

#### CIOMS

- CIOMS Working Groups
- CIOMS Form

# CDSCO (India) and Pharmacovigilance

- D&C Act and Schedule Y
- · Differences in Indian and global pharmacovigilance requirements

#### Recommended Books (Latest edition):

- 1. Textbook of Pharmacovigilance: S K Gupta, Jaypee Brothers, Medical Publishers.
- Practical Drug Safety from A to Z By Barton Cobert, Pierre Biron, Jones and Bartlett Publishers.
- 3. Mann's Pharmacovigilance: Elizabeth B. Andrews, Nicholas, Wiley Publishers.
- Stephens' Detection of New Adverse Drug Reactions: John Talbot, Patrick Walle, Wiley Publishers.
- An Introduction to Pharmacovigilance: Patrick Waller, Wiley Publishers.
- Cobert's Manual of Drug Safety and Pharmacovigilance: Barton Cobert, Jones & Bartlett Publishers.
- Textbook of Pharmacoepidemiolog edited by Brian L. Strom, Stephen E Kimmel, Sean Hennessy, Wiley Publishers.
- A Textbook of Clinical Pharmacy Practice -Essential Concepts and Skills:G. Parthasarathi, Karin NyfortHansen, Milap C. Nahata
- 9. National Formulary of India
- Text Book of Medicine by Yashpal Munjal

of. S-Kanth



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# LIST OF COURSES ADDRESSING GENDER ISSUES

S No	Name of the Course	
1	BP 101 T Human Anatomy and Physiology-I (Theory)	
2	BP 107 P Human Anatomy and Physiology-I (Practical)	
3	BP 201 T Human Anatomy and Physiology-II(Theory)	
4	BP 207 P Human Anatomy and Physiology-II (Practical)	
5	1.1 Human Anatomy and Physiology (Theory)	
6	1.1 Human Anatomy and Physiology (Practical)	

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#### BP101T. HUMAN ANATOMY AND PHYSIOLOGY-I (Theory)

45 Hours

Scope: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

Objectives: Upon completion of this course the student should be able to

- 1. Explain the gross morphology, structure and functions of various organs of the human body.
- Describe the various homeostatic mechanisms and their imbalances
- 3. Identify the various tissues and organs of different systems of human body.
- 4. Perform the various experiments related to special senses and nervous system.
- 5. Appreciate coordinated working pattern of different organs of each system

#### Course Content:

Unit I 10 hours

• Introduction to human body

Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology.

Cellular level of organization

Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine

Tissue level of organization

Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.

Unit II 10 hours

 Integumentary system Structure and functions of skin

Skeletal system

Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction

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Joints

Structural and functional classification, types of joints movements and its articulation

Unit III 10 hours

- Body fluids and blood
- Body fluids, composition and functions of blood, hemopoeisis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.
- Lymphatic system

Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system

Unit IV 08 hours

### Peripheral nervous system:

Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves.

Special senses
 Structure and functions of eye, ear, nose and tongue and their disorders.

Unit V 07 hours

#### Cardiovascular system

Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.

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#### BP107P. HUMAN ANATOMY AND PHYSIOLOGY (Practical)

4 Hours/week

Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.

- Study of compound microscope.
- 2. Microscopic study of epithelial and connective tissue
- 3. Microscopic study of muscular and nervous tissue
- 4. Identification of axial bones
- Identification of appendicular bones
- Introduction to hemocytometry.
- 7. Enumeration of white blood cell (WBC) count
- 8. Enumeration of total red blood corpuscles (RBC) count
- Determination of bleeding time
- 10. Determination of clotting time
- 11. Estimation of hemoglobin content
- 12. Determination of blood group.
- 13. Determination of erythrocyte sedimentation rate (ESR).
- 14. Determination of heart rate and pulse rate.
- 15. Recording of blood pressure.

#### Recommended Books (Latest Editions)

- Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
- Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
- Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MIUSA
- Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
- 5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

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#### BP 201T. HUMAN ANATOMY AND PHYSIOLOGY-II (Theory)

45 Hours

Scope: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

Objectives: Upon completion of this course the student should be able to:

- Explain the gross morphology, structure and functions of various organs of the human body.
- Describe the various homeostatic mechanisms and their imbalances.
- Identify the various tissues and organs of different systems of human body.
- Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.
- Appreciate coordinated working pattern of different organs of each system
- Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.

#### Course Content:

Unit I 10 hours

#### Nervous system

Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters.

Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid.structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts,reflex activity)

Unit II 06 hours

#### Digestive system

Anatomy of GI Tract with special reference to anatomy and functions of stomach, (Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine

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and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT.

#### Energetics

Formation and role of ATP, Creatinine Phosphate and BMR.

#### Unit III

Respiratory system

10 hours

Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration

Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods.

#### Urinary system

Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.

Unit IV 10 hours

#### • Endocrine system

Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal

gland, pancreas, pineal gland, thymus and their disorders.

Unit V 09 hours

### • Reproductive system

Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition

#### · Introduction to genetics

Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance

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#### BP 207 P. HUMAN ANATOMY AND PHYSIOLOGY (Practical)

4 Hours/week

Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.

- 1. To study the integumentary and special senses using specimen, models, etc.,
- 2. To study the nervous system using specimen, models, etc.,
- 3. To study the endocrine system using specimen, models, etc
- 4. To demonstrate the general neurological examination
- 5. To demonstrate the function of olfactory nerve
- 6. To examine the different types of taste.
- 7. To demonstrate the visual acuity
- 8. To demonstrate the reflex activity
- 9. Recording of body temperature
- To demonstrate positive and negative feedback mechanism.
  - Determination of tidal volume and vital capacity.
  - Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.
  - Recording of basal mass index
  - 14. Study of family planning devices and pregnancy diagnosis test.
  - 15. Demonstration of total blood count by cell analyser
  - Permanent slides of vital organs and gonads.

#### Recommended Books (Latest Editions)

- Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
- Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
- Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co.Riverview, MI USA

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# APPENDIX-A

(See regulation 8) PHARM.D. SYLLABUS

### First Year

### 1.1 HUMAN ANATOMY & PHYSIOLOGY (THEORY)

Theory: 3 Hrs. /Week

- Scope and Objectives: This course is designed to impart a fundamental knowledge
  on the structure and functions of the human body. It also helps in understanding both
  homeostasis mechanisms and homeostatic imbalances of various body systems. Since
  a medicament, which is produced by pharmacist, is used to correct the deviations in
  human body, it enhances the understanding of how the drugs act on the various body
  systems in correcting the disease state of the organs.
- 2. Upon completion of the course the student shall be able to:
  - a. describe the structure (gross and histology) and functions of various organs of the human body;
  - describe the various homeostatic mechanisms and their imbalances of various systems;
  - identify the various tissues and organs of the different systems of the human body;
  - d. perform the hematological tests and also record blood pressure, heart rate, pulse and Respiratory volumes;
  - e. appreciate coordinated working pattern of different organs of each system; and
  - f. appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body

### 3. Course materials:

### Text books

- Tortora Gerard J. and Nicholas, P. Principles of anatomy and physiology Publisher Harpercollins college New York.
- Wilson, K.J.W. Ross and Wilson's foundations of anatomy and physiology.
   Publisher: Churchill Livingstone, Edinburg.

# Reference books

- a. Guyton arthur, C. Physiology of human body. Publisher: Holtsaunders.
- b. Chatterjee, C.C. Human physiology. Volume 1&11. Publisher: medical allied agency, Calcutta.
- c. Peter L. Williams, Roger Warwick, Mary Dyson and Lawrence, H.
- d. Gray's anatomy. Publisher: Churchill Livingstone, London.

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# 4. Lecture wise program:

# Topics

- Scope of anatomy and physiology, basic terminologies used in this subject (Description of the body as such planes and terminologies)
- 2 Structure of cell its components and their functions.
- 3 Elementary tissues of the human body: epithelial, connective, Muscular and nervous tissues-their sub-types and characteristics
- 4 a) Osseous system structure, composition and functions of the Skeleton. (done in practical classes - 6hrs)
  - b) Classification of joints, Types of movements of joints and disorders of joints (Definitions only)

### 5 <u>Haemopoetic System</u>

- a) Composition and functions of blood
- b) Haemopoesis and disorders of blood components (definition of disorder)
- c) Blood groups
- d) Clotting factors and mechanism
- e) Platelets and disorders of coagulation

### 6 Lymph

- a) Lymph and lymphatic system, composition, formation and circulation.
- b) Spleen: structure and functions, Disorders
- c) Disorders of lymphatic system (definition only)

### 7 Cardiovascular system

- a) Anatomy and functions of heart
- b) Blood vessels and circulation (Pulmonary, coronary and systemic circulation)
- c) Electrocardiogram (ECG)
- d) Cardiac cycle and heart sounds
- e) Blood pressure its maintenance and regulation
- f) Definition of the following disorders
   Hypertension, Hypotension, Arteriosclerosis, Atherosclerosis, Angina, Myocardial infarction, Congestive heart failure, Cardiac arrhythmias

# 8 Respiratory system

- a) Anatomy of respiratory organs and functions
- b) Mechanism / physiology of respiration and regulation of respiration
- c) Transport of respiratory gases
- d) Respiratory volumes and capacities, and Definition of: Hypoxia, Asphyxia, Dybarism, Oxygen therapy and resuscitation.

#### 9 Digestive system

- a) Anatomy and physiology of GIT
- b) Anatomy and functions of accessory glands of GIT
- c) Digestion and absorption
- d) Disorders of GIT (definitions only)

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# 1.1 HUMAN ANATOMY & PHYSIOLOGY (PRACTICAL)

Practical: 3 Hrs./Week

General Requirements: Dissection box, Laboratory Napkin, muslin cloth, record, Observation book (100 pages), Stationary items, Blood lancet.

#### Course materials:

#### Text books

Goyal, R. K, Natvar M.P, and Shah S.A, Practical anatomy, physiology and biochemistry, latest edition, Publisher: B.S Shah Prakashan, Ahmedabad.

# Reference books

Ranade VG, Text book of practical physiology, Latest edition, Publisher: PVG, Pune Anderson Experimental Physiology, Latest edition, Publisher: NA

### List of Experiments:

- Study of tissues of human body
  - (a) Epithelial tissue.
  - (b) Muscular tissue.
- 2. Study of tissues of human body
  - (a) Connective tissue.
  - (b) Nervous tissue.
- 3. Study of appliances used in hematological experiments.
- 4. Determination of W.B.C. count of blood.
- Determination of R.B.C. count of blood.
- 6. Determination of differential count of blood.
- Determination of
  - (a) Erythrocyte Sedimentation Rate.
  - (b) Hemoglobin content of Blood.
  - (c) Bleeding time & Clotting time.
- Determination of
  - (a) Blood Pressure.
  - (b) Blood group.
- Study of various systems with the help of charts, models & specimens
  - (a) Skeleton system part I-axial skeleton.
  - (b) Skeleton system part II- appendicular skeleton.
  - (c) Cardiovascular system.
  - (d) Respiratory system.

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- (e) Digestive system.
- (f) Urinary system.
- (g) Nervous system.
- (h) Special senses.
- Reproductive system.
- Study of different family planning appliances.
- To perform pregnancy diagnosis test.
- Study of appliances used in experimental physiology.
- To record simple muscle curve using gastroenemius sciatic nerve preparation.
- To record simple summation curve using gastroenemius sciatic nerve preparation.
- To record simple effect of temperature using gastroenemius sciatic nerve preparation.
- To record simple effect of load & after load using gastroenemius sciatic nerve preparation.
- To record simple fatigue curve using gastroenemius sciatic nerve preparation.

# Scheme of Practical Examination:

	Sessionals	Annual
Identification	04	10
Synopsis	04	10
Major Experiment	07	20
Minor Experiment	03	15
Viva	02	15
Max Marks	20	70
Duration	03hrs	04hrs

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

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# LIST OF COURSES ADDRESSING HUMAN VALUES

S No	Name of the Course
1	1.3 Medicinal Biochemistry (Theory)
2	1.3 Medicinal Biochemistry (Practical)
3	2.1 Pathophysiology (Theory)
4	2.6 Pharmacotherapeutics-I (Theory)
5	2.6 Pharmacotherapeutics-I (Practical)
6	3.3 Pharmacotherapeutics-II (Theory)
7	3.3 Pharmacotherapeutics-II (Practical)
8	4.1 Pharmacotherapeutics-III (Theory)
9	4.1 Pharmacotherapeutics-III (Practical)
10	4.3 Clinical Pharmacy (Theory)
11	4.3 Clinical Pharmacy (Practical)
12	5.2 Pharmacoepidemiology and Pharmacoeconomics (Theory)
13	5.3 Clinical Pharmacokinetics and Pharmacotherapeutic Drug Monitoring (Theory)
14	BP 203T Bio Chemistry (Theory)
15	BP 209P Bio Chemistry (Practical)
16	BP204T Pathophysiology (Theory)
17	BP 703T Pharmacy Practice (Theory)
18	BP 802T Social and Preventive Pharmacy

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### 1.3 MEDICINAL BIOCHEMISTRY (THEORY)

Theory: 3 Hrs. /Week

 Scope of the Subject: Applied biochemistry deals with complete understanding of the molecular level of the chemical process associated with living cells.Clinical chemistry deals with the study of chemical aspects of human life in health and illness and the application of chemical laboratory methods to diagnosis, control of treatment, and prevention of diseases.

# Objectives of the Subject (Know, do, appreciate) :

The objective of the present course is providing biochemical facts and the principles to the students of pharmacy. Upon completion of the subject student shall be able to -

- a. understand the catalytic activity of enzymes and importance of isoenzymes in diagnosis of diseases;
- b. know the metabolic process of biomolecules in health and illness (metabolic disorders):
- c. understand the genetic organization of mammalian genome; protein synthesis; replication; mutation and repair mechanism;
- d. know the biochemical principles of organ function tests of kidney, liver and endocrine gland; and
- do the qualitative analysis and determination of biomolecules in the body fluids.

#### Text books (Theory)

- a. Harpers review of biochemistry Martin
- b. Text book of biochemistry D.Satyanarayana
- c. Text book of clinical chemistry- Alex kaplan &Laverve L.Szabo

#### Reference books (Theory)

- a. Principles of biochemistry -- Lehninger
- b. Text book of biochemistry -- Ramarao
- Practical Biochemistry-David T.Plummer.
- d. Practical Biochemistry-Pattabhiraman.

### Lecture wise programme:

### Topics

- 1 Introduction to biochemistry: Cell and its biochemical organization, transport process across the cell membranes. Energy rich compounds; ATP, Cyclic AMP and their biological significance.
- 2 Enzymes: Definition; Nomenclature; IUB classification; Factor affecting enzyme activity; Enzyme action; enzyme inhibition. Isoenzymes and their therapeutic and diagnostic applications; Coenzymes and their biochemical role and deficiency diseases.
- 3 Carbohydrate metabolism: Glycolysis, Citric acid cycle (TCA cycle), HMP shunt, Glycogenolysis, gluconeogenesis, glycogenesis. Metabolic disorders of carbohydrate metabolism (diabetes mellitus and glycogen storage diseases); Glucose, Galactose tolerance test and their significance; hormonal regulation of carbohydrate metabolism.

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- 4 Lipid metabolism: Oxidation of saturated (β-oxidation); Ketogenesis and ketolysis; biosynthesis of fatty acids, lipids; metabolism of cholesterol; Hormonal regulation of lipid metabolism. Defective metabolism of lipids (Atheroslerosis, fatty liver, hypercholesterolmiea).
- 5 Biological oxidation: Coenzyme system involved in Biological oxidation. Electron transport chain (its mechanism in energy capture; regulation and inhibition); Uncouplers of ETC; Oxidative phosphorylation;
- 6 Protein and amino acid metabolism: protein turn over; nitrogen balance; Catabolism of Amino acids (Transamination, deamination & decarboxylation). Urea cycle and its metabolic disorders; production of bile pigments; hyperbilirubinemia, porphoria, jaundice. Metabolic disorder of Amino acids.
- Nucleic acid metabolism: Metabolism of purine and pyrimidine nucleotides; Protein synthesis; Genetic code; inhibition of protein synthesis; mutation and repair mechanism; DNA replication (semiconservative /onion peel models) and DNA repair mechanism.
- 8 Introduction to clinical chemistry: Cell; composition; malfunction; Roll of the clinical chemistry laboratory.
- 9 The kidney function tests: Role of kidney; Laboratory tests for normal function includes-
  - a) Urine analysis (macroscopic and physical examination, quantitative and semiquantitative tests.)
  - Test for NPN constituents. (Creatinine /urea clearance, determination of blood and urine creatinine, urea and uric acid)
  - c) Urine concentration test
  - d) Urinary tract calculi. (stones)
- 10 Liver function tests: Physiological role of liver, metabolic, storage, excretory, protective, circulatory functions and function in blood coagulation.
  - a) Test for hepatic dysfunction-Bile pigments metabolism.
  - b) Test for hepatic function test- Serum bilirubin, urine bilirubin, and urine urobilinogen.
  - c) Dye tests of excretory function.
  - d) Tests based upon abnormalities of serum proteins.
     Selected enzyme tests.
- 11 Lipid profile tests: Lipoproteins, composition, functions. Determination of serum lipids, total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides.
- 12 Immunochemical techniques for determination of hormone levels and protein levels in serum for endocrine diseases and infectious diseases.

Radio immuno assay (RIA) and Enzyme Linked Immuno Sorbent Assay (ELISA)

13 Electrolytes: Body water, compartments, water balance, and electrolyte distrubution. Determination of sodium, calcium potassium, chlorides, bicarbonates in the body fluids.

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# 1.3 MEDICINAL BIOCHEMISTRY (PRACTICAL)

#### Practical: 3 Hrs./Week

#### Title of the Experiment:

- 1 Qualitative analysis of normal constituents of urine.\*
- 2 Qualitative analysis of abnormal constituents of urine.\*
- 3 Quantitative estimation of urine sugar by Benedict's reagent method.\*\*
- 4 Quantitative estimation of urine chlorides by Volhard's method.\*\*
- 5 Quantitative estimation of urine creatinine by Jaffe's method.\*\*
- 6 Quantitative estimation of urine calcium by precipitation method.\*\*
- 7 Quantitative estimation of serum cholesterol by Libermann Burchard's method.\*\*
- 8 Preparation of Folin Wu filtrate from blood.\*
- 9 Quantitative estimation of blood creatinine.\*\*
- 10 Quantitative estimation of blood sugar Folin-Wu tube method.\*\*
- 11 Estimation of SGOT in serum. \*\*
- 12 Estimation of SGPT in serum.\*\*
- 13 Estimation of Urea in Serum.\*\*
- 14 Estimation of Proteins in Serum.\*\*
- 15 Determination of serum bilirubin\*\*
- 16 Determination of Glucose by means of Glucoseoxidase.\*\*
- 17 Enzymatic hydrolysis of Glycogen/Starch by Amylases.\*\*
- 18 Study of factors affecting Enzyme activity. (pH & Temp.)\*\*
- 19 Preparation of standard buffer solutions and its pH measurements (any two)\*
- 20 Experiment on lipid profile tests\*\*
- 21 Determination of sodium, calcium and potassium in serum.\*\*
- \*\* indicate major experiments & \* indicate minor experiments

#### Assignments:

### Format of the assignment

- Minimum & Maximum number of pages.
- It shall be computer draft copy.
- Reference(s) shall be included at the end.
- Name and signature of the student.
- Assignment can be a combined presentation at the end of the academic year.
- Time allocated for presentation may be 8+2 Min.

### Scheme of Practical Examination:

	Sessionals	Annual
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max Marks	20	70
Duration	03hrs	04hrs

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

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# Second year

# 2.1 PATHOPHYSIOLOGY (THEORY)

Theory: 3 Hrs. /Week

- Scope of the Subject: This course is designed to impart a thorough knowledge of the
  relevant aspects of pathology of various conditions with reference to its
  pharmacological applications, and understanding of basic Pathophysiological
  mechanisms. Hence it will not only help to study the syllabus of pathology, but also
  to get baseline knowledge of its application in other subject of pharmacy.
- 2. Objectives of the Subject: Upon completion of the subject student shall be able to -
  - a. describe the etiology and pathogenesis of the selected disease states;
  - b. name the signs and symptoms of the diseases; and
  - mention the complications of the diseases.

### Text books (Theory)

- a. Pathologic basis of disease by- Cotran, Kumar, Robbins
- Text book of Pathology- Harsh Mohan
- Text book of Pathology- Y.M. Bhinde

# Reference books (Theory)

- Clinical Pharmacy and Therapeutics; Second edition; Roger Walker; Churchill Livingstone publication
- Detailed syllabus and lecture wise schedule :

# Chapter

- Basic principles of cell injury and Adaptation
  - Causes, Pathogenesis and morphology of cell injury
  - Abnormalities in lipoproteinaemia, glycogen infiltration and glycogen infiltration and glycogen infiltration and glycogen storage diseases

### 2 Inflammation

- Pathogenesis of acute inflammation, Chemical mediators in inflammation, Types of chronic inflammation
- Repairs of wounds in the skin, factors influencing healing of wounds

### 3 Diseases of Immunity

- a) Introduction to Tand B cells
- MHC proteins or transplantation antigens

of rejection of allograft.

- c) Immune tolerance
  - Hypersensitivity
     Hypersensitivity type I, II, III, IV, Biological significance, Allergy due to food, chemicals and drugs
  - Autoimmunity
     Criteria for autoimmunity, Classifications of autoimmune diseases in man, mechanism of autoimmunity, Transplantation and immunologic tolerance, allograft rejections, transplantation antigens, mechanism

Acquired immune deficiency syndrome (AIDS)



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### Amylodosis

- 4 Cancer: differences between benign and malignant tumors, Histological diagnosis of malignancy, invasions and metastasis, patterns of spread, disturbances of growth of cells, classification of tumors, general biology of tumors, spread of malignant tumors, etiology and pathogenesis of cancer.
- 5 Types of shock, mechanisms, stages and management
- 6 Biological effects of radiation
- 7 Environmental and nutritional diseases
  - Air pollution and smoking- SO2,NO, NO2, and CO
  - Protein calorie malnutrition, vitamins, obesity, pathogenesis of starvation.
- 8 Pathophysiology of common diseases
  - Parkinsonism
  - Schizophrenia
  - c. Depression and mania
  - d. Hypertension,
  - e. Stroke (ischaemic and hemorrhage)
  - f. Angina, CCF, Atherosclerosis, Myocardial infarction
  - g. Diabetes Mellitus
  - h. Peptic ulcer and inflammatory bowel diseases
  - Cirrhosis and Alcoholic liver diseases
  - j. Acute and chronic renal failure
  - k. Asthma and chronic obstructive airway diseases
- 9 Infectious diseases :

Sexually transmitted diseases (HIV, Syphilis, Gonorrhea), Urinary tract infections, Pneumonia, Typhoid, Tuberculosis, Leprosy, Malaria Dysentery (bacterial and amoebic), Hepatitis-infective hepatitis.

### Assignments:

### Title of the Experiment

- 1 Chemical Mediators of inflammation
- 2 Drug Hypersensitivity
- 3 Cigarette smoking & its ill effects
- 4 Biological Effects of Radiation
- 5 Etiology and hazards of obesity
- 6 Complications of diabetes
- 7 Diagnosis of cancer
- 8 Disorders of vitamins
- 9 Methods in Pathology-Laboratory values of clinical significance
- 10 Pathophysiology of Dengue Hemorrhagic Fever (DHF)

# Format of the assignment

- 1 Minimum & Maximum number of pages.
- 2. Reference(s) shall be included at the end.
- 3. Assignment can be a combined presentation at the end of the academic year
- 4. It shall be computer draft copy.
- Name and signature of the student
- Time allocated for presentation may be 8+2 Min.

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### 2.6 PHARMACOTHERAPEUTICS - I (THEORY)

Theory: 3 Hrs. /Week

- Scope of the Subject: This course is designed to impart knowledge and skills necessary
  for contribution to quality use of medicines. Chapters dealt cover briefly pathophysiology
  and mostly therapeutics of various diseases. This will enable the student to understand the
  pathophysiology of common diseases and their management.
- Objectives: At completion of this subject it is expected that students will be able to understand –
  - a. the pathophysiology of selected disease states and the rationale for drug therapy;
  - the therapeutic approach to management of these diseases;
  - c. the controversies in drug therapy;
  - d. the importance of preparation of individualised therapeutic plans based on diagnosis;
  - needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects);
  - f. describe the pathophysiology of selected disease states and explain the rationale for drug therapy;
  - g. summarise the therapeutic approach to management of these diseases including reference to the latest available evidence;
  - h. discuss the controversies in drug therapy;
  - i. discuss the preparation of individualised therapeutic plans based on diagnosis; and
  - identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).

#### Text Books

- Clinical Pharmacy and Therapeutics Roger and Walker, Churchill Livingstone publication.
- Pharmacotherapy: A Pathophysiologic approach Joseph T. Dipiro et al. Appleton & Lange.

# Reference Books

- Pathologic basis of disease Robins SL, W.B. Saunders publication.
- Pathology and therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice -Green and Harris, Chapman and Hall publication.
- Clinical Pharmacy and Therapeutics Eric T. Herfindal, Williams and Wilkins Publication.
- d. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA
- e. Avery's Drug Treatment, 4th Edn, 1997, Adis International Limited.
- f. Relevant review articles from recent medical and pharmaceutical literature.

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. Detailed syllabus and lecture wise schedule :

Etiopathogenesis and pharmacotherapy of diseases associated with following systems/ diseases

#### Title of the topic

- Cardiovascular system: Hypertension, Congestive cardiac failure, Angina Pectoris, Myocardial infarction, , Hyperlipidaemias , Electrophysiology of heart and Arrhythmias
- Respiratory system: Introduction to Pulmonary function test, Asthma, Chronic obstructive airways disease, Drug induced pulmonary diseases

  Endocrine system: Diabetes, Thyroid diseases, Oral contraceptives, Hormone replacement therapy, Osteoporosis
- General prescribing guidelines for
  - a. Paediatric patients
  - b. Geriatric patients
  - Pregnancy and breast feeding
- Ophthalmology: Glaucoma, Conjunctivitis- viral & bacterial
- Introduction to rational drug use Definition, Role of pharmacist Essential drug concept Rational drug formulations

#### 2.6 PHARMACOTHERAPEUTICS - I (PRACTICAL)

#### Practical: 3 Hrs./Week

#### Practicals:

Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion; attending ward rounds; follow up the progress and changes made in drug therapy in allotted patients; case presentation upon discharge. Students are required to maintain a record of cases presented and the same should be submitted at the end of the course for evaluation. A minimum of 20 cases should be presented and recorded covering most common diseases.

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 - 2000 words] should be submitted for

### Format of the assignment:

- Minimum & Maximum number of pages.
- Reference(s) shall be included at the end.
- Assignment can be a combined presentation at the end of the academic year.
- It shall be computer draft copy.
- Name and signature of the student.
- Time allocated for presentation may be 8+2 Min.

### Scheme of Practical Examination:

	Sessionals	Annual
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max Marks	20	70
Duration	03hrs	04hrs

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

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# 3.3 PHARMACOTHERAPEUTICS – II (THEORY)

Theory: 3 Hrs. /Week

- Scope of the Subject: This course is designed to impart knowledge and skills necessary
  for contribution to quality use of medicines. Chapters dealt cover briefly pathophysiology
  and mostly therapeutics of various diseases. This will enable the student to understand the
  pathophysiology of common diseases and their management.
- Objectives of the Subject Upon completion of the subject student shall be able to
  - a. know the pathophysiology of selected disease states and the rationale for drug therapy
  - know the therapeutic approach to management of these diseases;
  - know the controversies in drug therapy;
  - d. know the importance of preparation of individualised therapeutic plans based on diagnosis; and
  - appreciate the needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).

### Text books (Theory)

Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone publication

#### Reference books (Theory)

- a. Pharmacotherapy: A Pathophysiologic approach Joseph T. Dipiro et al. Appleton & Lange
- Clinical Pharmacy and Therapeutics Eric T. Herfindal, Williams and Wilkins Publication
- Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA]
- Detailed syllabus and lecture wise schedule :

Etiopathogenesis and pharmacotherapy of diseases associated with following systems / diseases –

### Title of the topic

- Infectious disease: Guidelines for the rational use of antibiotics and surgical Prophylaxis, Tuberculosis, Meningitis, Respiratory tract infections, Gastroenteritis, Endocarditis, Septicemia, Urinary tract infections, Protozoal infection- Malaria, HIV & Opportunistic infections, Fungal infections, Viral infections, Gonarrhoea and Syphillis
- 2 Musculoskeletal disorders Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic lupus erythematosus.
- Renal system

  Acute Renal Failure, Chronic Renal Failure, Renal Dialysis, Drug induced renal disorders

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4 Oncology: Basic principles of Cancer therapy, General introduction to cancer chemotherapeutic agents, Chemotherapy of breast cancer, leukemia. Management of chemotherapy nausea and emesis

5 Dermatology: Psoriasis, Scabies, Eczema, Impetigo

# 3.3 PHARMACOTHERAPEUTICS - II (PRACTICAL)

Practical: 3 Hrs./Week

#### Practicals :

Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion; attending ward rounds; follow up the progress and changes made in drug therapy in allotted patients; case presentation upon discharge. Students are required to maintain a record of cases presented and the same should be submitted at the end of the course for evaluation.

The student shall be trained to understand the principle and practice involved in selection of drug therapy including clinical discussion.

A minimum of 20 cases should be presented and recorded covering most common diseases.

#### Assignments:

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 - 2000 words] should be submitted for evaluation.

#### Format of the assignment:

- Minimum & Maximum number of pages.
- 2. Reference(s) shall be included at the end.
- 3. Assignment can be a combined presentation at the end of the academic year.
- It shall be computer draft copy.
- Name and signature of the student.
- 6. Time allocated for presentation may be 8+2 Min.

# Scheme of Practical Examination :

	Sessionals	Annual
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max Marks	20	70
Duration	03hrs	04hrs

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

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# Fourth Year

# 4.1 PHARMACOTHERAPEUTICS - III (THEORY)

Theory: 3 Hrs. /Week

- Scope: This course is designed to impart knowledge and skills necessary for contribution
  to quality use of medicines. Chapters dealt cover briefly pathophysiology and mostly
  therapeutics of various diseases. This will enable the student to understand the
  pathophysiology of common diseases and their management.
- Objectives: At completion of this subject it is expected that students will be able to understand –
  - a. the pathophysiology of selected disease states and the rationale for drug therapy;
  - the therapeutic approach to management of these diseases;
  - c. the controversies in drug therapy;
  - d. the importance of preparation of individualised therapeutic plans based on diagnosis;
  - needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects);
  - f. describe the pathophysiology of selected disease states and explain the rationale for drug therapy;
  - g. to summarize the therapeutic approach to management of these diseases including reference to the latest available evidence;
  - h. to discuss the controversies in drug therapy;
  - to discuss the preparation of individualised therapeutic plans based on diagnosis; and
  - identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).

# Text Books

- Clinical Pharmacy and Therapeutics Roger and Walker, Churchill Livingstone publication
- Pharmacotherapy: A Pathophysiologic approach Joseph T. Dipiro et al. Appleton & Lange

#### Reference Books

- Pathologic basis of disease Robins SL, W.B.Saunders publication
- Pathology and therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice -Green and Harris, Chapman and Hall publication
- Clinical Pharmacy and Therapeutics Eric T. Herfindal, Williams and Wilkins Publication
- d. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA
- Avery's Drug Treatment, 4th Edn, 1997, Adis International Limited.
- f. Relevant review articles from recent medical and pharmaceutical literature.

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# 4.1 PHARMACOTHERAPEUTICS – III (PRACTICAL)

Practical: 3 Hrs./Week

#### Practicals:

Hospital postings for a period of at least 50 hours is required to understand the principles and practice involved in ward round participation and clinical discussion on selection of drug therapy. Students are required to maintain a record of 15 cases observed in the ward and the same should be submitted at the end of the course for evaluation. Each student should present at least two medical cases they have observed and followed in the wards.

Etiopathogenesis and pharmacotherapy of diseases associated with following systems/ diseases:

#### Title of the topic

- 1 Gastrointestinal system: Peptic ulcer disease, Gastro Esophageal Reflux Disease, Inflammatory bowel disease, Liver disorders - Alcoholic liver disease, Viral hepatitis including jaundice, and Drug induced liver disorders.
- 2 Haematological system: Anaemias, Venous thromboembolism, Drug induced blood disorders.
- 3 Nervous system: Epilepsy, Parkinsonism, Stroke, Alzheimer's disease,
- 4 Psychiatry disorders: Schizophrenia, Affective disorders, Anxiety disorders, Sleep disorders, Obsessive Compulsive disorders
- 5 Pain management including Pain pathways, neuralgias, headaches.
- 6 Evidence Based Medicine

# Assignments:

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 - 2000 words] should be submitted for evaluation.

### Format of the assignment:

- 1. Minimum & Maximum number of pages
- Reference(s) shall be included at the end.
- 3. Assignment can be a combined presentation at the end of the academic year
- It shall be computer draft copy
- 5. Name and signature of the student
- Time allocated for presentation may be 8+2 Min.

# Scheme of Practical Examination:

	Sessionals	Annual
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max Marks	20	70
Duration	03hrs	04hrs

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

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### 4.3 CLINICAL PHARMACY (THEORY)

Theory: 3 Hrs. /Week

## 1. Objectives of the Subject:

Upon completion of the subject student shall be able to (Know, do, appreciate) -

- a. monitor drug therapy of patient through medication chart review and clinical review;
- obtain medication history interview and counsel the patients;
- identify and resolve drug related problems;
- d. detect, assess and monitor adverse drug reaction;
- e. interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states; and
- f. retrieve, analyse, interpret and formulate drug or medicine information.

### Text books (Theory)

- a. Practice Standards and Definitions The Society of Hospital Pharmacists of Australia.
- Basic skills in interpreting laboratory data Scott LT, American Society of Health System Pharmacists Inc.
- Biopharmaceutics and Applied Pharmacokinetics Leon Shargel, Prentice Hall publication.
- d. A text book of Clinical Pharmacy Practice; Essential concepts and skills, Dr.G.Parthasarathi etal, Orient Orient Langram Pvt.Ltd. ISSBN 8125026

#### References

- Australian drug information -Procedure manual. The Society of Hospital Pharmacists of Australia.
- b. Clinical Pharmacokinetics Rowland and Tozer, Williams and Wilkins Publication.
- Pharmaceutical statistics. Practical and clinical applications. Sanford Bolton, Marcel Dekker, Inc.

### 2. Detailed syllabus and lecture wise schedule:

#### Title of the topic

- Definitions, development and scope of clinical pharmacy
- 2. Introduction to daily activities of a clinical pharmacist
  - a. Drug therapy monitoring (medication chart review, clinical review, pharmacist interventions)
  - b. Ward round participation
  - Adverse drug reaction management
  - d. Drug information and poisons information
  - e. Medication history
  - f. Patient counseling
  - g. Drug utilisation evaluation (DUE) and review (DUR)
  - Quality assurance of clinical pharmacy services

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### Patient data analysis

The patient's case history, its structure and use in evaluation of drug therapy & Understanding common medical abbreviations and terminologies used in clinical practices.

- Clinical laboratory tests used in the evaluation of disease states, and interpretation of test results
  - a. Haematological, Liver function, Renal function, thyroid function tests
  - b. Tests associated with cardiac disorders
  - Fluid and electrolyte balance
  - d. Microbiological culture sensitivity tests
  - e. Pulmonary Function Tests

### 5. Drug & Poison information

- a. Introduction to drug information resources available
- b. Systematic approach in answering DI queries
- c. Critical evaluation of drug information and literature
- d. Preparation of written and verbal reports
- e. Establishing a Drug Information Centre
- f. Poisons information- organization & information resources

### 6. Pharmacovigilance

- a. Scope, definition and aims of pharmacovigilance
- Adverse drug reactions Classification, mechanism, predisposing factors, causality assessment [different scales used]
- c. Reporting, evaluation, monitoring, preventing & management of ADRs
- d. Role of pharmacist in management of ADR.
- Communication skills, including patient counselling techniques, medication history interview, presentation of cases.
- Pharmaceutical care concepts
- 9. Critical evaluation of biomedical literature
- Medication errors

### 4.3 CLINICAL PHARMACY (PRACTICAL)

#### Practical: 3 Hrs./Week

Students are expected to perform 15 practicals in the following areas covering the topics dealt in theory class.

- Answering drug information questions (4 Nos)
- Patient medication counselling (4 Nos)
- Case studies related to laboratory investigations (4 Nos)
- d. Patient medication history interview (3 Nos)

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## Assignment:

Students are expected to submit THREE written assignments (1500 - 2000 words) on the topics given to them covering the following areas dealt in theory class.

Drug information, Patient medication history interview, Patient medication counselling, Critical appraisal of recently published articles in the biomedical literature which deals with a drug or therapeutic issue.

### Format of the assignment:

- Minimum & Maximum number of pages.
- 2. Reference(s) shall be included at the end.
- 3. Assignment can be a combined presentation at the end of the academic year.
- 4. It shall be computer draft copy.
- Name and signature of the student.
- Time allocated for presentation may be 8+2 Min.

# 5.2 PHARMACOEPIDEMIOLOGY AND PHARMACOECONOMICS (THEORY)

Theory: 3 Hrs. /Week

#### 1. Pharmacoepidemiology:

#### Definition and scope:

Origin and evaluation of pharmacoepidemiology need for pharmacoepidemiology, aims and applications.

#### Measurement of outcomes in pharmacoepidemiology

Outcome measure and drug use measures

Prevalence, incidence and incidence rate. Monetary units, number of prescriptions, units of drugs dispensed, defined daily doses and prescribed daily doses, medication adherence measurement

## Concept of risk in pharmacoepidemiology Measurement of risk attributable risk and

Measurement of risk, attributable risk and relative risk, time-risk relationship and odds ratio

## Pharmacoepidemiological methods

Includes theoretical aspects of various methods and practical study of various methods with the help of case studies for individual methods

Drug utilization review, case reports, case series, surveys of drug use, cross — sectional studies, cohort studies, case control studies, case —cohort studies, meta — analysis studies, spontaneous reporting, prescription event monitoring and record linkage system.

#### Sources of data for pharmacoepidemiological studies

Ad Hoc data sources and automated data systems.

### Selected special applications of pharmacoepidemiology

Studies of vaccine safety, hospital pharmacoepidemiology, pharmacoepidemiology and risk management, drug induced birth defects.

#### 2. Phrmacoeconomics:

#### Definition, history, needs of pharmacoeconomic evaluations

Role in formulary management decisions

## Pharmacoeconomic evaluation

Outcome assessment and types of evaluation

Includes theoretical aspects of various methods and practical study of various methods with the help of case studies for individual methods:

Cost - minimization, cost- benefit, cost - effectiveness, cost utility

#### 3. Applications of Pharmacoeconomics

Software and case studies

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## 5.3 CLINICAL PHARMACOKINETICS AND PHARMACOTHERAPEUTIC DRUG MONITORING (THEORY)

Theory: 2 Hrs. /Week

Introduction to Clinical pharmacokinetics.

#### 2. Design of dosage regimens:

Nomograms and Tabulations in designing dosage regimen, Conversion from intravenous to oral dosing, Determination of dose and dosing intervals, Drug dosing in the elderly and pediatrics and obese patients.

#### 3. Pharmacokinetics of Drug Interaction:

- a. Pharmacokinetic drug interactions
- b. Inhibition and Induction of Drug metabolism
- c. Inhibition of Biliary Excretion.

#### 4. Therapeutic Drug monitoring:

- Introduction
- Individualization of drug dosage regimen (Variability Genetic, Age and Weight, disease, Interacting drugs).
- Indications for TDM. Protocol for TDM.
- d. Pharmacokinetic/Pharmacodynamic Correlation in drug therapy.
- TDM of drugs used in the following disease conditions: cardiovascular disease, Seizure disorders, Psychiatric conditions, and Organ transplantations.

#### 5. Dosage adjustment in Renal and hepatic Disease.

- Renal impairment
- b. Pharmacokinetic considerations
- c. General approach for dosage adjustment in Renal disease.
- Measurement of Glomerular Filtration rate and creatinine clearance.
- e. Dosage adjustment for uremic patients.
- Extracorporeal removal of drugs.
- g. Effect of Hepatic disease on pharmacokinetics.

#### Population Pharmacokinetics.

- a. Introduction to Bayesian Theory.
- Adaptive method or Dosing with feed back.
- c. Analysis of Population pharmacokinetic Data.

#### 7. Pharmacogenetics

- a. Genetic polymorphism in Drug metabolism: Cytochrome P-450 Isoenzymes.
- Genetic Polymorphism in Drug Transport and Drug Targets.
- c. Pharmacogenetics and Pharmacokinetics/Pharmacodynamic considerations

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### BP203 T. BIOCHEMISTRY (Theory)

45 Hours

Scope: Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

Objectives: Upon completion of course student shell able to

- Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
- Understand the metabolism of nutrient molecules in physiological and pathological conditions.
- Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.

#### Course Content:

UNIT I 08 Hours

#### Biomolecules

Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins.

#### Bioenergetics

Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy, Redox potential.

Energy rich compounds; classification; biological significances of ATP and cyclic AMP

UNIT II 10 Hours

## Carbohydrate metabolism

Glycolysis - Pathway, energetics and significance

Citric acid cycle- Pathway, energetics and significance

HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency

Glycogen metabolism Pathways and glycogen storage diseases (GSD)

Gluconeogenesis- Pathway and its significance

Hormonal regulation of blood glucose level and Diabetes mellitus

## Biological oxidation

Electron transport chain (ETC) and its mechanism.

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Oxidative phosphorylation & its mechanism and substrate level phosphorylation

Inhibitors ETC and oxidative phosphorylation/Uncouplers

UNIT III 10 Hours

### Lipid metabolism

β-Oxidation of saturated fatty acid (Palmitic acid)

Formation and utilization of ketone bodies; ketoacidosis

De novo synthesis of fatty acids (Palmitic acid)

Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D

Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity.

### Amino acid metabolism

General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders

Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenyketonuria, Albinism, alkeptonuria, tyrosinemia)

Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline

Catabolism of heme; hyperbilirubinemia and jaundice

UNIT IV 10 Hours

#### Nucleic acid metabolism and genetic information transfer

Biosynthesis of purine and pyrimidine nucleotides

Catabolism of purine nucleotides and Hyperuricemia and Gout disease

Organization of mammalian genome

Structure of DNA and RNA and their functions

DNA replication (semi conservative model)

Transcription or RNA synthesis

Genetic code, Translation or Protein synthesis and inhibitors

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UNIT V 07 Hours

#### Enzymes

Introduction, properties, nomenclature and IUB classification of enzymes

Enzyme kinetics (Michaelis plot, Line Weaver Burke plot)

Enzyme inhibitors with examples

Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation

Therapeutic and diagnostic applications of enzymes and isoenzymes

Coenzymes -Structure and biochemical functions

#### BP 209 P. BIOCHEMISTRY (Practical)

4 Hours / Week

- Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch)
- Identification tests for Proteins (albumin and Casein)
- Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method)
- Qualitative analysis of urine for abnormal constituents
- Determination of blood creatinine
- Determination of blood sugar
- Determination of serum total cholesterol
- Preparation of buffer solution and measurement of pH
- Study of enzymatic hydrolysis of starch
- Determination of Salivary amylase activity
- Study the effect of Temperature on Salivary amylase activity.
- 12. Study the effect of substrate concentration on salivary amylase activity.

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#### Recommended Books (Latest Editions)

- Principles of Biochemistry by Lehninger.
- Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
- 3. Biochemistry by Stryer.
- Biochemistry by D. Satyanarayan and U.Chakrapani
- 5. Textbook of Biochemistry by Rama Rao.
- Textbook of Biochemistry by Deb.
- 7. Outlines of Biochemistry by Conn and Stumpf
- 8. Practical Biochemistry by R.C. Gupta and S. Bhargavan.
- 9. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition)
- Practical Biochemistry for Medical students by Rajagopal and Ramakrishna.
- 11. Practical Biochemistry by Harold Varley.

#### BP 204T.PATHOPHYSIOLOGY (THEORY)

45Hours

Scope: Pathophysiology is the study of causes of diseases and reactions of the body to such disease producing causes. This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.

Objectives: Upon completion of the subject student shall be able to –

- Describe the etiology and pathogenesis of the selected disease states;
- 2. Name the signs and symptoms of the diseases; and
- 3. Mention the complications of the diseases.

### Course content:

Unit I 10Hours

· Basic principles of Cell injury and Adaptation:

Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury, Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage), Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis & Alkalosis, Electrolyte imbalance

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Basic mechanism involved in the process of inflammation and repair:
 Introduction, Clinical signs of inflammation, Different types of Inflammation, Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's, Mediators of inflammation, Basic principles of wound healing in the skin, Pathophysiology of Atherosclerosis

Unit II 10Hours

- Cardiovascular System:
  - Hypertension, congestive heart failure, ischemic heart disease (angina,myocardial infarction, atherosclerosis and arteriosclerosis)
- Respiratory system: Asthma, Chronic obstructive airways diseases.
- Renal system: Acute and chronic renal failure

Unit II 10Hours

- Haematological Diseases:
  - Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalasemia, hereditary acquired anemia, hemophilia
- Endocrine system: Diabetes, thyroid diseases, disorders of sex hormones
- Nervous system: Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease.
- Gastrointestinal system: Peptic Ulcer

Unit IV 8 Hours

- Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease.
- · Disease of bones and joints: Rheumatoid arthritis, osteoporosis and gout
- Principles of cancer: classification, etiology and pathogenesis of cancer
- · Diseases of bones and joints: Rheumatoid Arthritis, Osteoporosis, Gout
- Principles of Cancer: Classification, etiology and pathogenesis of Cancer

Unit V 7 Hours

Infectious diseases: Meningitis, Typhoid, Leprosy, Tuberculosis

Urinary tract infections

Sexually transmitted diseases: AIDS, Syphilis, Gonorrhea

Recommended Books (Latest Editions)

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- Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins & Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014.
- Harsh Mohan; Text book of Pathology; 6<sup>th</sup> edition; India; Jaypee Publications; 2010.
- Laurence B, Bruce C, Bjorn K.; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12<sup>th</sup> edition; New York; McGraw-Hill; 2011.
- Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor's Physiological basis of medical practice; 12th ed; united states;
- William and Wilkins, Baltimore; 1991 [1990 printing].
- Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston; Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/Churchill Livingstone; 2010.
- Guyton A, John .E Hall; Textbook of Medical Physiology; 12<sup>th</sup> edition; WB Saunders Company; 2010.
- Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey; Pharmacotherapy: A Pathophysiological Approach; 9<sup>th</sup> edition; London; McGraw-Hill Medical; 2014.
- V. Kumar, R. S. Cotran and S. L. Robbins; Basic Pathology; 6<sup>th</sup> edition; Philadelphia; WB Saunders Company; 1997.
- Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3<sup>rd</sup> edition; London; Churchill Livingstone publication; 2003.

## Recommended Journals

- The Journal of Pathology. ISSN: 1096-9896 (Online)
- 2. The American Journal of Pathology. ISSN: 0002-9440
- Pathology. 1465-3931 (Online)
- International Journal of Physiology, Pathophysiology and Pharmacology. ISSN: 1944-8171 (Online)
- Indian Journal of Pathology and Microbiology. ISSN-0377-4929.

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#### BP 703T. PHARMACY PRACTICE (Theory)

45 Hours

Scope: In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug information, and therapeutic drug monitoring for improved patient care. In community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counselling for improved patient care in the community set up.

Objectives: Upon completion of the course, the student shall be able to

- know various drug distribution methods in a hospital
- 2. appreciate the pharmacy stores management and inventory control
- monitor drug therapy of patient through medication chart review and clinical review
- obtain medication history interview and counsel the patients
- 5. identify drug related problems
- detect and assess adverse drug reactions
- interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states
- know pharmaceutical care services
- do patient counseling in community pharmacy;
- 10. appreciate the concept of Rational drug therapy.

Unit I: 10 Hours

### a) Hospital and it's organization

Definition, Classification of hospital- Primary, Secondary and Tertiary hospitals, Classification based on clinical and non- clinical basis, Organization Structure of a Hospital, and Medical staffs involved in the hospital and their functions.

## b) Hospital pharmacy and its organization

Definition, functions of hospital pharmacy, Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacists.

#### c) Adverse drug reaction

Classifications - Excessive pharmacological effects, secondary pharmacological effects, idiosyncrasy, allergic drug reactions, genetically determined toxicity, toxicity following sudden withdrawal of drugs, Drug interaction- beneficial interactions, adverse interactions, and pharmacokinetic drug interactions, Methods for detecting

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#### BP 802T SOCIAL AND PREVENTIVE PHARMACY

Hours: 45

#### Scope:

The purpose of this course is to introduce to students a number of health issues and their challenges. This course also introduced a number of national health programmes. The roles of the pharmacist in these contexts are also discussed.

#### Objectives:

After the successful completion of this course, the student shall be able to:

- Acquire high consciousness/realization of current issuesrelated to health and pharmaceutical problems within the country and worldwide.
- Have a critical way of thinking based on current healthcare development.
- Evaluate alternative ways of solving problems related tohealth and pharmaceutical issues

Course content:

Unit I: 10 Hours

Concept of health and disease: Definition, concepts and evaluation of public health. Understanding the concept of prevention and control of disease, social causes of diseases and social problems of the sick.

Social and health education: Food in relation to nutrition and health, Balanced diet, Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention.

Sociology and health: Socio cultural factors related to health and disease, Impact of urbanization on health and disease, Poverty and health

Hygiene and health: personal hygiene and health care; avoidable habits

Unit II: 10 Hours

Preventive medicine: General principles of prevention and control of diseases such as cholera, SARS, Ebola virus, influenza, acute respiratory infections, malaria, chicken guinea, dengue, lymphatic filariasis, pneumonia, hypertension, diabetes mellitus, cancer, drug addiction-drug substance abuse

Unit III: 10 Hours

National health programs, its objectives, functioning and outcome of the following: HIV AND AIDS control programme, TB, Integrated disease surveillance program (IDSP), National leprosy control programme, National mental health program, National

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programme for prevention and control of deafness, Universal immunization programme, National programme for control of blindness, Pulse polio programme.

Unit IV: 08 Hours

National health intervention programme for mother and child, National family welfare programme, National tobacco control programme, National Malaria Prevention Program, National programme for the health care for the elderly, Social health programme; role of WHO in Indian national program

Unit V: 07 Hours

Community services in rural, urban and school health: Functions of PHC, Improvement in rural sanitation, national urban health mission, Health promotion and education in school.

#### Recommended Books (Latest edition):

- Short Textbook of Preventive and Social Medicine, Prabhakara GN, 2<sup>nd</sup> Edition, 2010, ISBN: 9789380704104, JAYPEE Publications
- Textbook of Preventive and Social Medicine (Mahajan and Gupta), Edited by Roy Rabindra Nath, Saha Indranil, 4<sup>th</sup> Edition, 2013, ISBN: 9789350901878, JAYPEE Publications
- Review of Preventive and Social Medicine (Including Biostatistics), Jain Vivek, 6<sup>th</sup> Edition, 2014, ISBN: 9789351522331, JAYPEE Publications
- Essentials of Community Medicine—A Practical Approach, Hiremath Lalita D, Hiremath Dhananjaya A, 2<sup>nd</sup> Edition, 2012, ISBN: 9789350250440, JAYPEE Publications
- Park Textbook of Preventive and Social Medicine, K Park, 21<sup>st</sup> Edition, 2011, ISBN-14: 9788190128285, BANARSIDAS BHANOT PUBLISHERS.
- Community Pharmacy Practice, Ramesh Adepu, BSP publishers, Hyderabad

#### Recommended Journals:

Research in Social and Administrative Pharmacy, Elsevier, Ireland

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drug interactions, spontaneous case reports and record linkage studies, and Adverse drug reaction reporting and management.

#### d) Community Pharmacy

Organization and structure of retail and wholesale drug store, types and design, Legal requirements for establishment and maintenance of a drug store, Dispensing of proprietary products, maintenance of records of retail and wholesale drug store.

Unit II: 10 Hours

### a) Drug distribution system in a hospital

Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labelling, Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs.

#### b) Hospital formulary

Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary.

#### c) Therapeutic drug monitoring

Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring.

#### d) Medication adherence

Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence.

### e) Patient medication history interview

Need for the patient medication history interview, medication interview forms.

#### f) Community pharmacy management

Financial, materials, staff, and infrastructure requirements.

Unit III: 10 Hours

## a) Pharmacy and therapeutic committee

Organization, functions, Policies of the pharmacy and therapeutic committee in including drugs into formulary, inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation.

b) Drug

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Drug and Poison information centre, Sources of drug information, Computerised services, and storage and retrieval of information.

c) Patient

## counseling

Definition of patient counseling; steps involved in patient counseling, and Special cases that require the pharmacist

#### d) Education and training program in the hospital

Role of pharmacist in the education and training program, Internal and external training program, Services to the nursing homes/clinics, Code of ethics for community pharmacy, and Role of pharmacist in the interdepartmental communication and community health education.

#### e) Prescribed medication order and communication skills

Prescribed medication order- interpretation and legal requirements, and Communication skills- communication with prescribers and patients.

Unit IV 8 Hours

a) Budget

preparation and implementation

Budget preparation and implementation

#### b) Clinical Pharmacy

Introduction to Clinical Pharmacy, Concept of clinical pharmacy, functions and responsibilities of clinical pharmacist, Drug therapy monitoring - medication chart review, clinical review, pharmacist intervention, Ward round participation, Medication history and Pharmaceutical care.

Dosing pattern and drug therapy based on Pharmacokinetic & disease pattern.

### c) Over the counter (OTC) sales

Introduction and sale of over the counter, and Rational use of common over the counter medications.

#### Unit V 7 Hours

#### a) Drug store management and inventory control

Organisation of drug store, types of materials stocked and storage conditions, Purchase and inventory control: principles, purchase procedure, purchase order, procurement and stocking, Economic order quantity, Reorder quantity level, and Methods used for the analysis of the drug expenditure

b) Investigational use of drugs

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Description, principles involved, classification, control, identification, role of hospital pharmacist, advisory committee.

## c) Interpretation of Clinical Laboratory Tests

Blood chemistry, hematology, and urinalysis

### Recommended Books (Latest Edition):

- Merchant S.H. and Dr. J.S.Quadry. A textbook of hospital pharmacy, 4th ed. Ahmadabad: B.S. Shah Prakakshan; 2001.
- Parthasarathi G, Karin Nyfort-Hansen, Milap C Nahata. A textbook of Clinical Pharmacy Practice- essential concepts and skills, 1<sup>st</sup> ed. Chennai: Orient Longman Private Limited; 2004.
- William E. Hassan. Hospital pharmacy, 5th ed. Philadelphia: Lea & Febiger; 1986
- Tipnis Bajaj. Hospital Pharmacy, 1<sup>st</sup> ed. Maharashtra: Career Publications; 2008.
- Scott LT. Basic skills in interpreting laboratory data, 4thed. American Society of Health System Pharmacists Inc; 2009.
- Parmar N.S. Health Education and Community Pharmacy, 18th ed. India: CBS Publishers & Distributers; 2008.

#### Journals:

- Therapeutic drug monitoring. ISSN: 0163-4356
- Journal of pharmacy practice. ISSN: 0974-8326
- American journal of health system pharmacy. ISSN: 1535-2900 (online)
- 4. Pharmacy times (Monthly magazine)

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#### LIST OF COURSES ADDRESSING ENVIRONMENT & SUSTAINABILITY ISSUES

S No	Name of the Course
1	BP 206 T Environmental Sciences (Theory)

#### BP 206 T. ENVIRONMENTAL SCIENCES (Theory)

30 hours

Scope:Environmental Sciences is the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.

Objectives: Upon completion of the course the student shall be able to:

- 1. Create the awareness about environmental problems among learners.
- 2. Impart basic knowledge about the environment and its allied problems.
- 3. Develop an attitude of concern for the environment.
- Motivate learner to participate in environment protection and environment improvement.
- Acquire skills to help the concerned individuals in identifying and solving environmental problems.
- 6. Strive to attain harmony with Nature.

#### Course content:

Unit-I 10hours

The Multidisciplinary nature of environmental studies

Natural Resources

Renewable and non-renewable resources:

Natural resources and associated problems

a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.

Unit-II 10hours

Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit- III 10hours

Environmental Pollution: Air pollution; Water pollution; Soil pollution

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RBVRR Women's College of Pharmacy

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# Recommended Books (Latest edition):

- Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Pu blishing Pvt. Ltd., Ahmedabad – 380 013, India,
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.
- Clark R.S., Marine Pollution, Clanderson Press Oxford
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.

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