ANNAMALAI UNIVERSITY

DIPLOMA IN PHARMACY

PART – I PART – II AND PART – III

RULES AND REGULATIONS 1999 - 2000

Rules and Regulations for conducting Diploma in Pharmacy Part – I and Part – II Courses and examination and Part – III Practical training by Annamalai University as per the New Educational Regulations, 1991 of the Pharmacy Council of India constituted under the Pharmacy Act 1948.

DIPLOMA IN PHARMACY (PART – I AND PART – II)

1. Minimum qualification for admission to Diploma in Pharmacy Part – I course.

A pass in any of the following examinations with Physics, Chemistry, Biology and Mathematics.

1. Intermediate examination in Science.
2. The first year of the three year degree course, in Science.
3. 10 + 2 examination (academic stream) in Science.
4. Pre-degree examination; or
5. Any other qualification approved by Annamalai University and the Pharmacy Council of India as equivalent to any of the above examinations.

2. Duration course:

The duration of the courses shall be for two academic years, with each academic year spread over a period of not less than one hundred and eighty working days in addition to 500 ours practical training spread over a period of not less than 3 months.

Course of Study:

The course of study for Diploma in Pharmacy Part – I and Diploma in Pharmacy Part – II shall include the subjects as given in the Tables I & II below. The number of hours devoted to each subject for its teaching in, Theory and Practical shall not be less than that noted against it in columns 2 and of the Tables below.

TABLE – I

DIPLOMA IN PHARMACY (PART – I)

	(A)	(B)
Subject	No. of hours of theory	No. of hours of practical
Pharmaceutics – I	75	100
Pharmaceutical Chemistry – I	75	75
Pharmacognosy	75	75
Biochemistry & clinical Pathology	50	75
Human anatomy & Physiology	75	50
Health Education & community Pharmacy	50	
	400	375 = 775

TABLE – II

DIPLOMA IN PHARMACY (PART – II)

	(A)	(B)
Subject	No. of hours of theory	No. of hours of practical
Pharmaceutics – II	75	100
Pharmaceutical Chemistry – II	100	75
Pharmacognosy & Toxicology	75	50
Pharmaceutical Jurisprudence	50	...
Drug Store and Business Management	75	...
Hospital and Clinical Pharmacy	75	50
	450	275 = 275

4. the syllabus for each subject of study in the said tables shall be as specified in Appendix A to these regulations.

5. Examinations:

There shall be an examination for Diploma in Pharmacy (Part – 1) to examine the students to the first year course and an examination for Diploma in Pharmacy (Part – II) to examine students for the second year course. Each examination may be held twice in a year. The first examination in a year shall be supplementary examination of the Diploma in Pharmacy (Part -–I) or Diploma in Pharmacy (Part – II), as the case may be. The examinations shall be of written and practical (including oral) nature, carrying maximum marks for each part of a subject as indicated in table III and IV below:

TABLE – III

DIPLOMA IN PHARMACY (PART – I) EXAMINATION

Subject	Maximum Marks for Theory			Maximum Marks for Practical		
	Examination	Sessional	Total	Examination	Sessional	Total
Pharmaceutics – I	80	20	100	80	20	100
Pharma Chem – I	80	20	100	80	20	100
Pharmacognosy	80	20	100	80	20	100
Biochemistry & Clinical Pathology	80	20	100	80	20	100
Human Anatomy & Physiology	80	20	100	80	20	100
Health Education Community & Pharmacy	80	20	100	…	…	…
			600			500
Total					=	1,500

* Internal assessment

TABLE – IV

DIPLOMA IN PHARMACY (PART – II) EXAMINATION

Subject	Maximum Marks for Theory			Maximum Marks for Practical		
	Examination	Sessional	Total	Examination	Sessional	Total
Pharmaceutics – I	80	20	100	80	20	100
Pharma Chem – II	80	20	100	80	20	100
Pharmacology & Toxicology	80	20	100	80	20	100
Pharmaceutical Jurisprudence	80	20	100			
Drugs Store & Business Mgt.	80	20	100			
Hospital & Pharmacy	80	20	100	80	20	100
			600			400
Total					=	1,000

* Internal assessment

6. Eligibility for appearing at the Diploma in Pharmacy Part – I Examination:

Only such candidates who produce certificate from the Head of the Inst. of Pharm. Technology, Annamalai University in proof of his/her having regularly and satisfactorily undergone the course of study by attending not less than 75% of the class held both in theory and in practical separately in each subject shall be eligible for appearing at the Diploma in Pharmacy (Part – I) examination.

7. Eligibility for appearing at the Diploma Pharmacy Part – II Examination:

Only such candidates who produce certificate from the head of the Inst. of Pharm. Technology, Annamalai University in proof of his her having regularly and satisfactorily undergone the Diploma in Pharmacy Part – II course by attending not less than 75% of the classes held both theory and practicals separately in each subject, shall be eligible for appearing at the Diploma in Pharmacy (Part – II) examination.

8. Teachers are required to maintain attendance of students in Attendance Register.

9. Mode of Examinations:

1. Each theory and practical examination in the subject-mentioned in table – III & IV shall be of three hours duration.
2. A candidate and who falls in theory of practical examination of a subject shall re-appear only in theory or practical, of the same subject.
3. Practical examination shall also consist of a viva-voce (oral) examination.

10. Award of Sessional Marks and maintenance of Records.

1. A regular record or both theory and practical class work and examinations conducted in by Annamalai University Diploma in Pharmacy Part – I and Diploma in Pharmacy Part – II courses, shall be maintained each for student and 20 marks for each theory and 20 marks for each practical subject shall be allotted as sessionals.
2. There shall be at least three periodic sessional examinations during each academic year. The highest aggregate of any two performance shall form the basis of calculating sessional marks.
3. The sessional marks in practicals shall be allotted on the following basis.

   Actual performance in the practical sessional examination – 10.

   Day to Day assessment in the practical a less works – 10.

11. Minimum Marks for passing to examination:

A statement shall not be declared to have passed D.Pharm exam unless he/she secures at least 40% in each subject separately in theory and practical exam & secures 50% Marks in over all aggregate of the exam. However they have declared to have passed the subject (&) in which they secure more than 50 marks.

The Candidate securing 60% marks or above in aggregate in all subjects in a single attempt at the Diploma in Pharmacy (Part – I) or Diploma in Pharmacy (Part – II) examinations shall be declared to have passed in first class the Diploma in Pharmacy (Part – I) or Diploma in Pharmacy (Part – II) examinations, as the case may be candidates securing 75% marks or above in any subject or

subjects shall be declared to have passed with distinction in that subject or these provided he/she passes in all the subjects in a single attempt.

12. Eligibility for promotion to Diploma in Pharmacy (Part – II)

All candidates who have appeared for all the subjects and passed the Diploma in Pharmacy Part – I Examination are eligible for promotion to the Diploma in Pharmacy Part – II class. However, failure in more than any two theory and any two practical papers of D.Pharm first year subjects shall debar him/her from promotion to the Diploma in Pharmacy Part – II class.

13. Improvement of sessional Marks:

Candidates who wish to improve sessional marks can do so, by appearing in two additional sessional examinations during the next academic year. The average score of the two examinations shall be on the basis for improved sessional marks in theory. The sessional of practicals shall be improved by appearing in additional practical examinations. Marks awarded to a candidate for day to day assessment in the practical class, can not be improved unless he/she attends a regular course of study again.

14. Certificate of passing examination for Diploma in Pharmacy (Part – II)

Certificate for having passed the examination for the Diploma in Pharmacy, Part – II shall be granted by the Annamalai University to a student after the successful completion of Part – I and Part – II, respectively.

15. Rule pertaining to the conductance of University theory and practical examinations for D.Pharmacy Part – I and Part – II of Annamalai University.

As per the existing rules and regulations.

DIPLOMA IN PHARMACY (PART – III)

(PRACTICAL TRAINING)

17. Period and other conditions of Practical training:

1. After having appeared in Part – II examination of Diploma in Pharmacy conducted by the Annamalai University a candidate shall be eligible to undergo practical training into one or more of the following Institutions namely:
   i. Hospitals / Dispensaries run by Central / State Government / Municipal Corporations / Central Government Health Scheme and Employees State Insurance Scheme.
   ii. A pharmacy, Chemist and Druggist licensed under the Drugs and Cosmetic Rules, 1945 made under the Drugs and Cosmetic Act, 1940 – 923 of 1940).
   iii. Drugs manufacturing Unit licensed under the Drugs and Cosmetics Act, 1940 and rules made there under.

2. The Institutions referred in sub-regulation (1) shall be eligible to impart training subject to the condition that the member of student pharmacists that may be taken in any hospital Pharmacy, chemist and druggist and Drugs manufacturing unit licensed under the Drugs manufacturing unit licensed the Drugs and Cosmetics Rules 1945 made under the Drugs and Cosmetics Act, 1940 shall not exceed two where there is one registered pharmacist engaged in the work in which student pharmacist in which student is under going practical training, where is more than one registered pharmacist similarly engaged, the number shall no, exceed one for each additional such registered pharmacist.

3. Hospital and Dispensary other than those specified in sub religion (1) for the purpose of giving practical training shall have to be recognised by Pharmacy Council of India on fulfilling Conditions specified in Appendix D to these regulations.

4. In the course of practical training, the trainee shall have exposure to.

i. Working knowledge of keeping of records required by various act concerning the profession of Pharmacy and

ii. Practical experience in

   a. The manipulation of Pharmaceutical apparatus in common use.

   b. The reading, translation and copying of prescription including checking of doses;

   c. The dispensing of prescriptions illustration the commoner methods of administering medicaments and

   d. The storage of drugs and medical preparations.

5. The practical training shall be not less than five hundred hours spread over period of not less than three months, provided that not less than two hundred and fifty hours are devoted to actual dispensing of prescriptions.

17. Procedure to be followed prior to commencing of the training;

1. The Head of an academic training institution, on application shall in triplicate 'Practical Training Contract From for qualification as Pharmacist' (herein after referred to as the Contract Form) to candidate eligible to under-take the said practical training. The Contract Form shall be as specified in Appendix – E to these regulations.
2. The Head of an academic training institution shall fill section I of the Contract Form The trainee shall fill section II of the said Contract Form and the Head of the institution agreeing impart the training (hereinafter as the Appendix – C Register) shall fill section III of the said Contract Form.
3. It shall be the responsibility of the trainee to ensure hat one copy (hereinafter referred to as the Head of the academic training institution and the other two copies (hereinafter referred to as the second copy and the third copy) shall be

filled with the Apprentice master (if he so desires or with the trainee pending completion of the training).

18. Certificate of passing Diploma in Pharmacy (Part – III):

On satisfactory completion of apprentice period, the apprentice master shall fill SECTION IV the second copy and third copy of the contract Form and cause it to be sent to the head of the academic training institution who shall suitably enter in the first copy of the entries from the second copy and third copy and shall fill SECTION V of the there copies of Contract Form there after hand over both he second copy and third copy to the trainee.

This, if completed in all respects, shall be regarded as a Certificate of having successfully completed the course of diploma in Pharmacy (Part – III).

19. Certificate of Diploma in Pharmacy

A certificate of Diploma in Pharmacy shall be granted by the Annamalai University to a successful candidate on producing certificate of having passed the Diploma in Pharmacy Part – I and Part – II and satisfactory completion of practical training for Diploma in Pharmacy (Part – III).

APPENDIX – A

SYLLABUS

1.1 PHARMACEUTICS - I

Theory (75 hours)

1. Introduction of different dosage forms their classification with examples their relative applications Familiarization with new drug delivery systems.
2. Introduction to Pharmacopoeias with special reference to the Indian Pharmacopoeia.
3. Metrology Systems of Weights and measures Calculation including conversion from one to another system, system, percentage calculations and adjustment of products. Use of alligation method in calculations, solutions.
4. Packaging of Pharmaceuticals – Desirable features of a container – types of containers, Study of glass and plastics as materials for closures – their merits and demerits introduction of aerosol packaging.
5. Size reduction – Objectives, and factors affecting size reduction, methods of size reduction – Study hammer mill, ball mill, fluid mill and Disintegrator.
6. Size separation – Size separation by shifiting Official standards for powders Sedimentation methods of size separation, Construction and working of Cyclone separator.
7. Mixing and Homogenization-Liquid mixing and powder mixing, Mixing semisolids. Study of Silverson Mixer-Homoaeniser Planetary Mixer Agitated Powder Mixer, tripie Roller Miller Propeller Mixer, Colloid Mill and Haod Homogeniser, double cone mixer.

8. Classification and Filtration-Theory of Filtration: filter media Filter aids and section of filters. Sutdy of the following separation equipments – Filler press Sintered Filters Filter Candles. Metafilter.
9. Extraction and Galenicals – (a) Study of parcolation and maceration and their modifications, continucus hot extraction-Applications in the preparation of tinctures and extracts (b) Introduction to Ayurvedic dosage forms.
10. Heat processes – Evaporation – Definitions – Factors affecting evaporation Study of evaporation still and Evaporating pan.
11. Distillation – simple distillation and Fractional Distillation Steam distillation and vaccum still, preparation of Purified Water I.P. and water for injection I.P. Construction and working of the still used for the Same.
12. Introduction to drying processed – study of Tray Dryers: Fluidized Bed Dryer, Vaccum Dryer and Freeze Dryer.
13. Sterilization – Concept of sterilization and its differences from disiofection – Thermal resistance of micro organisms Detailed Study to following sterilisation processes.
    i. Sterilization with most heat.
    ii. Dry heat sterilization.
    iii. Sterilization by radiation.
    iv. Sterilization and filtration.
    v. Gaseous Sterilization.

    Asptic techniques – Application of setrilization processes in hospitals particularly with reference to surgical dressings and intravenonus fluids, precautions for safes and effective handling of sterilization equipment.
14. Processing of Tablets – Definitions; Different types of compressed tablets and their properties processes involved in the production of tablets; tablets excipients Dofects in tablets; Evalution of Tablets; Physical standards including Disintegration and Dissolution. Tablet coating Sugar coating; film coating enteric coating and microen capsblation (tablet coating may be dealt in an elementary manner).
15. Processing of capsules – Hard and soft gelatin capsules, different sizes of capsules; filling of capsules handling and storage of capsules, Special applications of capsules.
16. Study of immunological products like sera, vaccines toxoids and their preparations.

PRACTICAL (100 hours)

Preparation (minimum number stated against each) of the following categories illustrating different techniques involved.

1.	Aromatic waters	3
2.	Solutions	4
3.	Spirts	2
4.	Tinctures	4
5.	Creams	2
6.	Cosmetic preparation	3
7.	Capsules	2
8.	Tablets	2
9.	Preparing involving Sterilization	2
10.	Opthalmicpreparations	2
11.	Preparing Involving Aseptic Techniques	2

Books Recommended : (Latest Edition)

1. Remingston Pharmaceuticals Sciences.
2. The extra Pharmacopeio – Martinddaler.

PHARMACEUTICAL CHEMISTRY – I

Theory (75 hours)

1. General discussions on the following inorganic compounds including important physical and chemical properties, medicinal and pharmaceutical uses storage conditions and chemical incompatibility.
   - A. Acids, bases and buffers – Boric acid hydrochloric acid; strong ammonium hydrooxide, calcium hydroxide sodium hydroxide, and offici buffers.
   - B. Antioxidants-Hypophosphorous acid, Sulpher dioxide, Sodium bisullphite, Sodium ment bisulphite, Sodium thiosulphate, Niotro and Sodium Nitrite.
   - C. Gastrointestinal agents
     - i. Acidifying agents – Dilute hydrochoric acid
     - ii. Antacid – Sodium bicarbonate, aluminium hydroxidegel aluminium phosphate, calcium carbonate, magnesium carbonate, magnesium trisilicate magnesium oxide, con blanations of antacid preparations.
     - iii. Protectives and Adsorbent – Bismuth subcorbonate Kaolin.
     - iv. Saline cathartics Sodium Pottassium tartate and magnesium sulphate.

D. Topical agents

   i. Protectives-tozic, Zinc Oxide calamine, Zinc, stearat Titanium dioxide, Silicon polymers.

   ii. Antimicrobials and Astringents-Hydrogen peroxide Pottassium permanganate. Chlorinated lime, iodine, Solutions of iodine, Providone-iodine, Boric acid, Borax. Silver nitrate, Mild silver protein, Mercury, yellow mercurioxide, Ammoniated mercury.

   iii. Sulphur and its compounds Sublimed sulphurs, precipitated sulphur, Selenium sulphide.

   iv. Astringents: Alum anmd Zinc Sulphate.

E. Dental products – Sodium fluroide stannous fluoride Calcium carbonate, sodiummetaphosphate, dicalcium phosphate, Strontium chloride, Zinc chloride.

F. Inhalants – Oxygen, Carbon dioxide, Nitous oxide.

G. Respiratory stimulants – Ammonium carbonate.

H. Expectorants and Emetics – Ammonium chloride, Potassium iodide. Antimony Potassium tartrate.

   1. Antidotes – Sodium nitrite

   2. Major Intra and Extracellular eletrolyes.

A. Electrolytes used for replacement therapy-Sodium chloride and its preparatioins, Potassium chloride and its preparations.

B. Physiological acid base balance and electrolytes used Sodium acetate, Potassium accetate Sodium bicarbonate injection, Sodium citrate, Potassium citrate, Sodium lactate injection Ammonium chloride and its injection.

C. Combination of oral electrolyte powders and solutions.

3. Inorganic Official compounds of Iron Iodine, and Calcium Ferroius Sulfate and calcium gluconate.

4. Radio pharmaceuticals and Contrast media – Radio activity – Alpha, Beta and Gamma Radiations, Biological effects of raditions, Measurement of radio activity G.M. Counter – Rdio Isotopes – their uses storage and precautions with special reference to the official preparations.

   Radio opaque Contrast media-Barium sulphate.

5. Quality control of Drugs and Pharmaceuticals importance of quality control, Significant errors, methods used for quality control, sources of impurities in Pharmaceuticals Limit tests for Arsenic, chloride, sulfate, Iron and Heavy metals.

6. Identification tests for cations and anions as per Indian Pharmacopoeia.

PRACTICAL (75 hours)

1. Identification test for organic compounds particularly drugs and pharmaceuticals.
2. Limit test for chloride, sulfate Arsenic, Iron and heavy metals.
3. Assay of inorganic Pharmaceuticals involving each of the following methods of compounds marked with (o) under theory.
   a. Acid – Base titrations (atleast 3).
   b. Redox titrations (Co each permanganometry and iodimetry).
   c. Precipation titrations (atleast 2).
   d. Complexometric titrations (calcium and Magnesium).

   Books recommended (latest editions).

   1. Indian pharmacopoeia.

1 3 PHARMACOGNNSY

Theory (75 hours)

1. Defintion history and scope of Pharmacagnosy including indigenous system of medicine.
2. Various systems of classification of drugs of natural origin.
3. Adulteration and drug evaluation significance of Pharmacopocial standards.
4. Brief outline of occurrence, distribution outline of isolation, identification tests, therapeutic effects and Pharmaceutical applications of alkaloids terpenoids, glycosides, volatile oils, tannins and resins.
5. Occurrence, distribution, Organoleptic evaluation, chemical constitutents includng tests whereover applicable and therapeutic efficacy of following categories of drugs.
   a. Laxatives Aloes, Rhubarb, Castor oil, Ispaghulla, Senna.
   b. Cardiotonics – Digitalis, Arjuna.
   c. Carminatives & G.I. regulators – Umbelliferous fruits. Corlander, Fennel, Ajowan, cardamom, Ginger, Black pepper, Asafoetida, Nutmeg, Cinnamon, Clove.
   d. Astrngents – catechu.
   e. Drug acting on nervous system – Hyoscyamus Bolladonna, Acconite, Ashwagandha, Ephedra, Opium Cannabls, Nux vomica.
   f. Antihypertensives – Rauwolfia.
   g. Antitussives – Vasaka. Tolu balsam, Tulsi.
   h. Antirheumatics – Gaggul, Colehicum.
   i. Antitumour – Vinca

j. Antileprotics – Chaulmoogra Oil.

k. Antidiabetics – Pterocorups, Gymnema, yivestris.

l. Diuretics – Gohru, Punamava.

m. Antidysenterics – Ipecauanha.

n. Antisoptics and disinfectants Bonzoin, Myrrh Neem, curcuma.

o. Antimalarials – cinchona.

p. Oxytocios – Ergot.

q. Vitamines – Shark liver Oil and Amla

r. Enzymes-papaya,a diastase, Yeast

s. Perfumes and flavouring agents-pepermint Oil, Lemon Oil, Orange Oil, Lemon grass Oil, Sandal wood.

t. Phjarmaceutical aids – Honey, Archis Oil, Starch, Kaolin, Oectin, Olive oil, Laonlin, Beeswas, Acacia, Tragacanth, Sodium alginate, Agar, Guar gum, Helatin.

u. Miscellaneous – Liguorice, Garlic Picrorhiza, diocores, Linseed, Shatavair, Shankhushpi, Pyrethrums, Tabacco.

6. Collection and preparation of crude drugs for the marker as examplified by ergot, opium, Rauwolfia, Digitalis, Senna.

7. Study of source, preparation and identification of fibres used in sture and surgical dressing – cotton, silk, wool and recognised fibres.

8. Gross anatomical studies of – Senna, Datura, Cinnamon, Cinchona, fennel, Clove, Ginger, Nuxvomica & Ipecacuanha.

PRACTICAL (75 hours)

1. Identification of drugs by morphological characters.

2. Physical and chemical tests for evaluation of drugs wherever applicable.

3. Gross anatomicalstudies (t.s) of the following drugs Senna, Datura, Cinnomon, Cinnomon, Cinchona, Coriander, Fennel, Clove, Ginger Nuxvomica, Ipecacuanha.

4. Identification of fibres and surigacl dressings.

14. BIOCHEMISTRY AND CLINICAL PATHOLOGY

Theory (50 hours)

1. Introduction to Biochemistry.

2. Brief chemistry and role of proteins, polypeptides and amino acids. Classification, Qualitative tests, Biological value Deficiency diseases.

3. Brief Chemistry and role of Carbohydrates, Classification qualitative tests, Diseases related to carbohydrate metabolism.

4. Brief chemistry and role of Lipids, Classification, qualitative tests, Diseases related olipids metabolism.
5. Brief Chemistry and role of vitamins and Bioenzymes.
6. Role of minerals and water in life processes.
7. Enzymes; Brief concept of enzymic action. Factors affecting it. Thereapeutic and Pharmaceutical importance.
8. Brief concept of normal and abnormal metabolism of proteins, carbohydrates and lipids.
9. Introductions to pathology of blood and urine.
    a. Lymphocytes and Platelets, their role in health and disease.
    b. Erythrocytes – Abnormal cells and their significance.
    c. Abnormal constituents of urine and their significance in diseases.

PRACTICAL (75 hours)

1. Detection and identification of Proteins, Amino acids Carbohydrates and Lipids.
2. Analysis of normal and abnormal constituents of Blood and Urine (Glucose, Urea, Creatine, Creatinine, cholesterol alkaline phosphatase, acid phosphatase, Bilirubin SGPT, SGOT, Calcium Diastase, Lipase).
3. Examination of sputum and facees (microscopic & staining).
4. Practice in injecting drugs by intramuscular, subcutaneous and intravenous routes, withdrawal of blood samples.

1.5 HUMAN ANATOMY AND PHYSIOLOGY

Theory (75 hours)

1. Scope of Anatomy and a Physiology. Definition of various terms used in Anatomy.
2. Structure of cell, function of its components with special reference to mitochondriam scrosomes.
3. Elementary tissues of the body i.e. epithelial tissue musclar tissue, and nervous tissue.
4. Structure and functions of skeleton. Classification of joints and their of functions, join disorders.
5. Composition of blood, functions of blood elements Blood group and coagulation of blood. Brief information regarding disorders of blood.
6. Name and functions of lymph glands.
7. Structure and functions of various part of the heart, Arterial and venous system with special reference to the names and positions of main arteries and

veins. Blood presure and its recording. Brief information about cardiovascular disorders.

8. Various parts of respiratory system and their functions, Physiology of respiration.
9. Various parts of urinary system and their functions, structure and functions of kidney, physiology of urine formation, pathophysiology of renal diseases and oedema.
10. Structure of skeletal muscle. Physiology of muscle contraction, names positions attachments and functions of various skeletal muscles. Physiology of neuromusuclar junction.
11. Various parts of central nervous system, brain and its parts, functions and reflex action. Anatomy and Physiology of autonomic nervous system.
12. Elementary knowledge of structure and functions of the organs of taste ear eye and skin. Physiology of pain.
13. Diggestive system, names of the various part of digestive system and their functions. Structure and functions of liver, physiology of digestion and absorption.
14. Endocrine glands and Hormones. Location of the glands their hormones and functions. Pituitary, Thyroid, Adrenal and pancreas.
15. Reproductive system physiology and Anatomy of Reproductive system.

PRACTICAL (50 hours)

1. Study of the human skeleton.
2. Study with the help of charts and models of the following systems and organs.
   a. Digestive system.
   b. Respiratory system.
   c. Cardiovascular system.
   d. Urinary system.
   e. Eye.
   f. Ear.
3. Microscopic examination of epithelial tissue, cardiac muscle, smooth muscle, skeletal muscle, Connective tissue and nervous tissues.
4. Examination of blood films for TLC, DLC and malarial parasite.
5. Determination of clotting times of blood, erthyrocyte sedimentation rate of Hemoglobin value.
6. Recording or body temperature, pulse, heart rate, blood pressre and ECG.

HEALTH EDUCATION AND COMMUNITY PHARMACY

Theory (50 hours)

1. Concept of health – Definition of Physical Health, mental health, social health – determinants of health, indicators of health, concept of disease, natural history of diseases the disease agents, concept of prevention of diseases.
2. Nutrition and health – classification of floods, require ments, diseases induced due to deficency of proteins, Vitamine, and Minerals-treatment and prevention.
3. Demography and family planning – demography cycle fertility family planning, contraceptive method, behavioural methods, natural family planning method, chemical method mechanical methods, hormonal contraceptives, population Problem of India.
4. First aid-Emergency treatment on shock, snake-bite bums poisoning, heart disease, fractures and resucitation methods, elements of monor surgery and dressings.
5. Environment and health-Sources of water supply, water pollution, purification of water, health and air, noise light-solid waste disposal and control medical entemology. Arthropod borne diseases and their control, rodents, animals and diseases.
6. Fundamental parinciples of microbiology – classification or microbes, isolation, staining techniques of organisms of common diseases.
7. Communicable diseases – Causative agents, mode of transmission and prevention.
    a. Respiratory infection – Chicken pox. measles, influenza, diphtheria, whooping cough and tuberculosis.
    b. Intestinal infections Poliomyelitis, Heptitis, Cholera, Typhoid, Food poisoning, Hookworm infection.
    c. Arthropod born infection – Plague, Malaria, Filariasis.
    d. Surface infection Rabies Trachoma, Tetanus Leprosy.
    e. Sexually transmitted diseases – Syphillis, Gonorthoea, AIDS.
8. Non Communicable disease-Causative agents, care and control of cancer, diabetes, Blindness, Cardiovascular disease.
9. Epldimiology-its scope, methods, uses, dynamics of disease transmission immunisation. Immunological products and their dose schedule. Principles of disease control and prevetnion, hospital acquried infection, prevention and control Disinfection types of disinfection, disinfection procedures, for faces, urine, sputum, roomlinen, dead bodies instruments.

2.1 PHARMACEUTICS - II

Theory (75 hours)

Dispensing Pharmacy:

i. Prescriptions – reading and understanding of prescriptions. Latin terms commonly used (Detailed studyis not necessary), Modern methods of prescribing of metric system. Calculation involved in disponsing.

ii. Incompatibilities in Prescription – Study of various types incompatibilities-physical, chemical and the rapeutic.

iii. Posology-Dose and dosage of drugs. Factories influencing dose. Calculation of doses on the basis of age, sex, and surface area. Veterinary doses.

Dispensing Medications:

(Note A detailed study of the following dispensed medication is necessary. Methods of preparation with theore-tical and practical aspects, use of appropriate containers and clouseres, Special tabelling requirements and storage conditions should be high-lighted).

i. Powders-Types of Powders-Advantages and disadvantages of Powders, granules, canchets and tablet triturates, preparation of different types of powders encountered in prescription Weighing methods, possible erros in weighing, minimum weighable amounts and weighing, of a material below the minimum weighable amount, geometric dilution and proper usage and care of dispensing balance.

ii. Liquid Oral Dossage forms:

   a. Monophasic – Theoretical aspects including commonly used vehicles, essential adjuvant lieu stabilizers, colourants and flavour, with examples.

Review of the following monophasic liquids with details of formulation and practical methods.

Liquids for internal administration	Liquids for external administration or used on muous membrances
Mixture and Concetrates Syrups	Gargles, Mouth waslies, Throat paints.
Elixirs	Douches Ear Drops Nasal Drops & Sprays Liniments, Lotions.

   b. Biphasic Liquid Forms:

      i. Suspensions (elementary study) – Suspensions containing diffusiable solids and liquids and their preparation, Study of the adjuvants used like thickening agents. Wetting agents, their necessity and quantity to be incorporated, Suspensions of precipitate forming liquids like tinctures, their preparations and stability, Suspensions produced by chemical reaction. An introduction to flocculated non-flocculated suspension system.

ii. Emulsion – Types of emulsion, identification of emulsion systems formulation of emulsion selection of emulsifying agents, Instabilities, in emulsion. Preservation of emulsion.

iii. Semi-Solid Dosage Forms:

a. Ointments-Types of ointments, classification and selection of dermatological vehicles, preparation and stability of ointments by the following processes:

i. Trituration ii. Fusion iii. Chemical reaction iv. Emulsification.

b. Pastes – Differences between ointments and pastes, bases of pastes, preparation of pastes and their preservation.

c. Jellies – An introduction to the different types of jellies.

d. An elementary study of populticе.

e. Suppositories and pessaries – Their relatives merits and demerits, types of suppostories, suppository bases, classification, properties, preparation and packing of suppositories. Use of suppositories for drug – absorption.

iv. Dental Cosmetics preparation :

Introduction to Dentrifices, Facial cosmetics, Deodorants, Antiperspirants, Shapoos, hair dressing and hair removers.

v. Sterile Dosage Forms:

a. Parenteral dosage forms – Definition, General requirments for parenteral dosage forms. Types of parenteral formulations, vehicles, adjuvants, processing personnel, facilities and quality control Preparation of Itravenous fluids and admixtures total parenteral nitrition, Dialysia fluids.

b. Sterility testing particulate matter monitoring – faitysuale – packaging.

c. Ophthalmic products – study of essential characteristics of different opthalmic preparations formulation additives special precautions in handling and storage of opthalmic products.

PRACTICAL (100 hours)

Dispensing of atleast 100 products covering a wide range of preparations such as mixtures, emulsion, lotions, liniments, E.N.T. preparations, ointments, Suppositories, powders, incompatible prescriptions etc.

Books recommended (latest editions)

1. Indian Pharmacopoeia.
2. British pharmacopoeia.
3. National Formularies (N.F.I.B.N.F.).

4. Remington's Pharmaceutical Sciences.
5. Martindale's Extra Pharmacopeia.

2.2 PHARMACEUTICALS CHEMISTRY - II

Theory (100 hours)

1. Introduction to the nomenclature of organic chemical systems with particular reference to hetero-cyclic system containing upto 3 rings.
2. The chemistry of following Pharmaceuticals organic compounds, covering their nomenclature, chemical structures uses and the important physical and chemical properties, (chemical) structure of only those compounds marked with asterik (o).

The stability and storage conditions and the different type of Pharmaceuticals formulation of these drugs and their popular brand names.

Antiseptics and Disinfectants-Proflavine, Benzakonium chloride, Cetrimide, Chloro cresol, Chloroxyene, Formaldehyde solution, Hexachlorophene, Liquid phenol, Nitro furation. Sulflathiaxzole, Succinyl Sulfathiazole, Suifadimethozine, Sulfamethoxy pyridazine, Sulfa methoxazole, co-trimoxazole Sulfacetamide.

Antilprotic Drugs – clofazimine, Thiambutosine, Dapsene, Solapsone – Anti tubercular Drugs – Isoniazid Pas, Streptomycin, Rilampicin, Ethabiuto, Thiacetazone, Ethionmide, Cyoloserine, Pyrazamide.

Antiamoebic and Anthelmintic Drugs – Emetine, Metronidazle, Halogenated, hydroxyquinclines, diloxanide furoate paramomycin Piperazine, Mebendazole D.E.C.

Antibiotics-penzyl Pencillino, Phenoxy monthly Pencillin, Benzathine Pencillin, Ampicillino, Cloxacillin Carbenicillian, Gentamycin, Neomycin, Erytromycin, Teracline, Cephalexin, Cephaloridine, Cephalothin Cephalothin Griseofulvin, Chloramphonicol.

Antifungal agents-Undocylenic acid, tolnaftate, Nystatin, Amphoterecin, Hamycin.

Antimalarial Drugs – Chloroquine, Amodiaquine Primaquine, Pro-uanil, Pyrimethamine, Quinine. Trime. Thoprim.

Tranqullizers Chlorpromazine, Prochlor Perazine Trifluo Perazine, friothizene, Haloperidol, Triperodol, Oxypertine, Chlorodiazepecxodem Diazepam, Lerazepam, Membrobamate.

Hypnotics: - Phenobarbitone, Butabrbitone, Cyclobarbitone Nitrozepam, Glutethimide, Methyprylon, paraldyhyde, Triclofossodium.

General Anaesthetics – Halothane, Cyclopropance, Diethyl ether, methohexital sodium. Thiopental sodium, Trichoro ethylene Antidepressant Drugs – Amitriptyline. Nortryptyline, Imipramine, Phenezine, tranylcypromine.

Analeptics-theophyline, cafeine, Coramine, Dextro amphetamine, Adrenergic Drugs-Adrenaline Nordreanline, Isoprenaline, Phenylephrine, Salbutamol, Terbutra-line, Emphedrine, Psedudo ephedrine. Adrenergic Antagonist Tolazoline, Propranolol, Practolal, Cholinergic Drugs-Neostigmie, Pyridostigmine, Pralidoxime, Pilocarpine Physiostigmine.

Cholinergic Antagenists Atropine, Hoscine, Homatropine Propantheline, benztropine. Tropicamide, Biperidne.

Diuretic Drugs-Furosmide, Cholothiazide, Hydrochlorhiazide, Benzthiazide, Urea, Mannitol Ethacrynic-acid.

Cariovascular Drugs – Ethyl nitrite, Glyceryl trinitrate Apohamethydopa, Guarethicine Clofibrate Quinidine.

Hypoglycemie Agents-Insulin, Chlorpropamide. Tolbutamide Glibeneclamide, Phenformin, Metformin.

Cogulants and Anti Cogulants-heparin, Thrombin, Menadioneo, Bishydroxycoumarin. Warfarin sodium.

Local anethetics – Linnocaineo, Procaineo, Benovacaine Histamine, Promethazine, Cyprohepataine, Mepyramine, Pheniramine, Chlorpheniramine. Analgesics and Antipyretics-Morphine. Pethidine, Codeine, Metnfone Aspirin paracetamolo, analgin Dextroproposyphone, Pentazocines Non-steriodal anti inflammatory Agents indomethacir, Phenylbutazone Oxyphen butazone, Ibuprofen.

Thyrosxine and Antithyroids-Thyroxine, Methimazole. Methyl thiouracil Propylthiouracil.

Diagnostic agents Ipoanic Acid. Propyliodone, Sulfsbromophthalein Sodium, It disotindisulfonate sodium (indigo Carmine) Evans blue, Congo Red Fluoreseein Sodium.

Anticonvulsants, cardiac glycosides, Antiarrhythmic antihypertensives & vitamins.

Steroidal Drug – Betamethazone, Cortisone, Hydro cortisone, Prednisolone, Progestorone, testosterone, Oestradiol nandrelone. Anti-Neoplastic Drugs-Actinomycins, Azathiopine. Busulphan, Chlorambucil, Cisplatin, cyclophosphamide Daunorubicin, Hydrochloride, fluorouracil, Mercaptopurine Methorexate, Mytomycin.

Books recommended [Latest Editions:]

1. Pharmacopoeia of India.
2. British Pharmaceutical Codex.
3. Martindale's Extra Pharmacopoeia.

PRACTICAL (75 hours)

1. Systematic qualitative testing of organic drugs involving solubility determination, melting point and or boiling point. Detection of elements and functional groups (10 compounds).
2. Official identification tests for certain groups of drugs included in the I.P. like barbiturates, sulfomides, phenothianies, Antibiotics etc. (8 compound).
3. Preparation of three of simple organic preparations.

2.3 PHARMACOLOGY & TOXICOLOGY

Theory (75 hours)

1. Introduction to Pharmacology, scope of Pharmacology.
2. Routes of administration of drugs, their advantages and disadvantages.
3. Various a processes of absorption of drugs and the factors affecting them Metabeliam, distribution and excretion of drugs.
4. General mechanism of drugs action and the factors which modify drug action.
5. Pharmacological classification of drugs. The discussion of drug should emphasise the following aspects.

1. Drug acting on the Central Nervous system:
   a) General anaesthetics, adjunction to anaesthesia, intravenous anaesthetics.
   b) Analgesic and non steroidal anti-inflammatory drugs. Narcotic analesics. Antirhematic and antigout remedies Sedatives and Hypnotics, Psycho pharmacological agents, anto convulsants, analeptics.
   c) Neurone blockers and ganglion blockers.
   d) Neuromuscular blockers, drugs used in myasthenia gravis.

iv) Drugs acting on eye. Mydriatics, drugs used in glaucoma.

v) Drugs acting on respiratory system respirator stimulants Bronchodilators, nasal decongestant. expectorants and Antitussive agents.

vi) Antacids, physiological role of histamine and serotonin, histamine and Anthistamines, Prostaglandins.

vii) Cardio Vascular Drugs Cardiotenics, Antiarhythmic agents, Antianginal agents, Antihypertensive agents, Peripheral Vasodilators and drugs used in atherosclerosis.

viii) Drugs acting on the blood and blood forming organs Haematincs, cagulants and anticoagulants, Heamostatics, Blood substitutes and plasma expanders.

ix) Drugs effecting renai function Diuretics and antidiureics.

x) Harmons and hormone antagonists Hypoglycemic agents Anitithyroid drugs, sex harmone and oral centraceptives corticosteroids.

6. Chemetherapy of microbial disease Urinary antiseptics, Sulphonamides, Penicilins, Streptomycin Tetracyclines and other antibiatics, Antitubercular agents, Antifungal agents, autiviral drugs antileprotio drugs.
7. Chemotherapy of protozoal diseases Anthelminti drugs.
8. Chemotheraphy of cancer.
9. Disinfectants and antiseptics. A detailed study of the action of drugs on each organ is not necessary.

PHARMACOLOGY

PRACTICAL (50 hours)

The first six of the following experiments will be done by the students while the remining will be demonstrated by the teacher.

1. Effect of K+, Ca++, acetyl choline and adrenaline on frog's heart.
2. Effect of acetyl choline on rectus abdominis muscle of Frog and guinea pig ileum.
3. Effect of spasmogens and relaxants on rabbits intestine.
4. Effect of local anaesthetics on rabbit comea.
5. Effect of mydriatics and miotics on rabbits comea.
6. To study the action of strychnine on frog.
7. Effect of hyphotics in mice.
8. Effect of digital is on frog's heart.
9. Effect of convulsants and anti convulsant in miceoandrats.
10. Test for pyrogens.
11. Taming and potentiating of hypnosis effecting of chloripromazine in mice/rats.
12. Effect of diphenhydraomine in experimentally produced asthma in guinea pigs.

2.4 PHARMACEUTICALS JURISPRUDENCE

Theory (50 hours)

1. Origin and nature of Pharmaceutical legislation in India its scope and objectives. Evolution of the Concept of Pharmacy as an integral part of the health care system.
2. Principle and significanced of Professional Ethics, Clinical study of the code of Pharmaceutical Ethics drafted by Pharmacy Council of India.
3. Pharmacy Act 1948 The general study of the Pharmacy Act with special reference to education Regulation working of State and Central Councils, constitution of these councils and functions. Registration procedures under Act.

4. The drugs and Cosmetic Act, 1940 – General Study of the Drugs and Cosmetics a Act and the Rules thereunder definition and salient features related to retail and whole sale distribution of drugs. The powers of Inspectors, the sampling procedures and the procedure and formalities in obtaining licences under the rule. Facilities to be provided for running a pharmacy effectively. General study of the schedules with special reference to schedules C, C, F, C, J, H, P and X and salient features labelling and storage conditions of drugs.
5. The drugs and magic remedies (Objectionable Advertisement) Act 1954 – General study of the Act Objectives, special reference to be laid on Advertisement. Magicremedies and objectionable and permitted advertisements diseases which cannot be clamied to be cured.
6. Narcotic Drugs and Psychotropic Substances Act 1985 – A brief study of the act with special reference to its objectives offences and punishment.
7. Brief introduction to the study of the following acts.
    1. Latest Drugs (Price Control Order in force).
    2. Poisons Act 1919 (as amended to date).
    3. Medicinal and Toiler Preparation (Excise Duties) Act, 1955 (As amended to date).
    4. Medical Termination of preganancy Act. 1971 (as amended to date).

Books Recommended (Latest edition):

Bare Acts of the said laws published by the Government.

2.5 DRUGSTORE AND BUSINESS MANAGEMENT

Theory (75 hours)

Part – I Commerce (50 hours)

1. Introduction – Trade Industry and comerce, Functions and subdivision of Commerce. Introduction to Elements of Economics and Management.
2. Forms of Business Organisations.
3. Channels of Distribution.
4. Drug House Management-selection of Site, Space lay-out and legal lequireme Importance and Objectives of purchasing, selection of supliers, credit information, tenders Contracts, and Price determination. And legal requriements there to. Codification, handling of drug stores and other hospitals supplies.
5. Inventory Control – Objects and importance, Modern techniques like ABC, VED analysis, the lead time, inventory carrying cost. Safety stock, minimum and maximum stock levels, economic order quantity scrap and surplus disposal.

6. Sales Promotion Market Research, Salesmanship qualities of a salesman, Advertising and compensation of the pharmacist.
7. Recruitment, training, evaluation and compensation of the pharmacist.
8. Banking and Finance – Service and functions of banka, Finance planning and sources of finance.

PART – II ACCOUNTANCY (25 hours)

1. Introduction to the accounting concepts and conventions, Double entry, Book keeping Different kinds of accounts.
2. Cash Book.
3. General Ledger and Trail balance Sheet.
4. Profit and Loss Account and Balance Sheet.
5. Simple techniques of analysing financial statements. Introduction to Budgetting.

Books Recommended (Latest Edition)

1. Remington Pharmaceuticals Sciences.

HOSPITAL AND CLINICAL PHARMACY

Theory (75 hours)

1. Part – I Hospital Pharmacy.
    1. Hospital Definition, Function Classifications based on various criteria, organisation. Management and health delivery system in India.
    2. Hospital Pharmacy:
        a) Definition.
        b) Functions and objectives of Hospital
        c) Location, layout Flow chart of materials and men.
        d) Personnel and facilities requirements including equipments based on individual and basic needs.
        e) Requirements and abilities required for Hospital Pharmacists.
    3. Drug Distribution System in Hospitals:
        a) Out-patient services.
        b) In-patrent services: a) types of services, b) detailed discussion of Unit Dose systems Floor ward stock system, Sateilite pharmace services, Control sterile services Bed, Sid pharmacy.
    4. Manufacturing:
        a) Economical considerations, estimation of demand.
        b) Sterile manufacture large and small volume parenterals, facilities, requirements, layout, Production planin, man-power requirements.

c) Non-sterile manufacture Liquid orals, externals, Bulk concentrates.

d) Procurement of stores and testing of raw materials.

5. Nomenclature and uses of surigcal Instruments and hospital Equipments add health accessories.
6. P.T.C. (Pharmacy Therapeutic Committee) Hospital Formularly System and their organisations, functioning Composition.
7. Drug Information service and Drug Information Bulletin.
8. Surgical dressing like cotton, gauze bandages and adhesive tapes including their phatmacopoeial tests for quality. Other hospital supply eg. I.V. sets B.G. sets Rails tubes Catheters Syrings etc.
9. Application of computer in Maintenance of records inventory conrol, Modification, monitoring, drug information and data storage and retrieval in hosspitals and retails pharmacy establishments.

Part – II: Clinical Pharmacy:

1. Introduction to Clinical Pharmacy, Practies, Definition, scope.
2. Modern dispensing aspects, Pharmacists and patlent councelling and advice for the use of common drugs, medication history.
3. Common daily terminology used in the practice of Medicine.
4. Disease manifestations and pathophysiology including salient symptoms to understand the disease like Tuberculosis Hepatitis, Rheumatoid Arthritis, Cardio-Vascular diseases Epilepsy. Diabetes, Peptic Ulcer, Hypertension.
5. Physiological parameters with their significance.
6. Drug Interactions:

   a) Definition and introduction.

   b) Mechanism of Drug interaction.

   c) Drug-drug interaction with reference to analegics, diuretics caridio vascular drugs, Gas trointestinal agent.

   d) Drug-food interaction.

7. Adverse Drug Reactions:

   a) Reactions and significance.

   b) Drug-induced diseases and Teratogeniciry.

8. Drug in Clinical Toxicity – Introduction general, treatment of poisoning, systematic antodotes, Treatment of insecticide poisoning heavy poison, Narcotic drug, Barbiturate, Organophosphours poisons.
9. Drug dependents Drug abuse, addictive drugs and their treatment complications.

10. Bio availability of drugs, including factors affecting its Books Recommended: (Latest Edition).
    1. Remington's Pharmaceutical Sciences.
    2. Martindale's Extra Pharmacopaeis

PRACTICAL (50 hours)

1. Preparation of transiusion fluids.
2. Testing raw materials used in (1)
3. Evaluation of surgical dressings.
4. Sterilization of surgical instruments, glass-ware and other hospital supplies.
5. Handling and use of data processing equipments.

APPENDIX – E

(See Regulation 21(1))

PRACTICAL TRAINING CONTRACT FORM FOR PHARMACISTS

SECTION - I

This form has been issued ..... (Name of student pharmacist) son of / daughter of ..... residing at ..... who has produced evidence before me that he/she is entitiled to receive the practical training as set out in the Education regulation farmed under section 10 of the Pharmacy Act. 1948.

The Head of the Academic

Training Institution

Date:

SECTION - II

I ..... accept (Name of the student Pharmacist) ..... (of) ..... (Name of the Apprentice Master) (Name of the Institution) .....

Hospital or Pharmacy as my Apprentice master for the above training and agree to obey and respect him / her during entire period of my training.

.....

Student Pharmacist

SECTION - II

1. ..... (Name of the apprentice master) ..... (Name of the Student Pharmacist) trainee and I agree to give him / her training facilities in my organisation so that during his / her training he / she may acquire:

1. Working knowledge of keeping of records required by the various Acts affecting the profession of pharmacy and
2. Practical experience in:
   a) The manipulation of pharmaceutical apparatus in common use.
   b) The reading translation and copying of prescriptions including the checking of doses.
   c) The dispensing of prescriptions illustrating the commoner methods of administering medicaments and
   d) The storage of drugs and medicinal preparations. I also agree that a Registered Pharmacist shall be assigned his / her guidance.

(Apaprentice Master)

(Name and address of the Institution)

SECTION - IV

I certify that …… (Name of the Student Pharmacist) has undergone …… hours training spread over …… months inaccordance with the details enumerated in SECTION III.

……

Head of the Organisation or

(Pharmaceutical Division)

SECTION - V

I certify that …… (Name of Student Pharmacist) has completed in all respect his practical training under regulation 20 of the Education Regulations framed under section 10 of the Pharmacy Act, 1948. He had his practical training in an Institution approved by the Pharmacy Council India.

……

(Head of the Academic Institution)

Date:

Books Recommended:

PHARMACEUTICS – I & PHARMACEUTICS - II

1. Mithal T.B. Pharmaceutical formation.
2. The Pharmacopocia of India.
3. National formularly.
4. Reminton's Pharmaceutical Sciences, Mack Publishing Co.
5. United States Pharmacopocia.
6. Cooper and Gunn dispensing for Pharmaceutical Students, Pitaman Publishing House.
7. British Pharmaceutical Codex.
8. The British Pharmacopocia.
9. Extra Pharmacopocia. Martindale.
10. Cooper and Gunn: "Tutorial Pharmacy"
11. "Professional Pharmacy" Part ii, Sohroff.

Pharmaceutical Jurisprudance:

1. "Code of Pharmaceutical Ethics – PCI, New Delhi.
2. Mithal B.M. "A.T.B. of Forensic Pharmacy".

B. Hospital and clinical Pharmacy:

1. Hospital Pharmacy, William E. Hassan Lea febigem
2. Mirrors “Hospital Pharmacy”
3. “Clinical Pharmacy Practice” Blissed Webb & Stanaszech.
4. “Clinical Pharmacy & therapeutics herfinald & Hirachmen Williams & Wilken.

Pharmaceutical Chemistry – I

1. L.M. Atherdon, “Bentaley and Driver’s T.B. of Pharmaceutical Chemistry” Oxford University Press.
2. I.P., B.P. and U.S.P.
3. Block, Roche and Wilson “Inorganic Medicinal and Pharmaceutical Chemistry Lea and Febiged.
4. Beckett and Stenleke “Pharmaceutical Chemistry”.

Pharmaceutical Chemistry – II

1. L.M. Atherden “Bentleuy and Driver’s T.B. of Pharmaceutical Chemistry” Oxford University Press.
2. I.P. and B.P.
3. B.P.C.
4. Wilso, Gisvold and Doerge. T.B. of organic medical and Pharmaceutical Chemistry.

Pharmacognosy:

1. T.E. Wallies, T.B. of Pharmacognosy, A. Churchill & Co.
2. C.E. Trease “T.B. of Pharmacognosy balliers Tindal & Co.
3. T.E. Wallis, “Practical Pharmacognosy”.
4. Shah, C.S. & Quardy. J.S.A.T.B. of Pharmacognosy M/s. B.S. Shah, 1183 Panore Road, Ahemedabad.

Bio-Chemistry:

1. Ambnika Shanmugam, “T.B. of Bio Chemistry”
2. Ramakrishnan, “T.B. of Bio Chemistry”

Anatomy & Physiology:

1. Seers W. Gordon – Anatomy, Physiology for Nurses Edward Amold (Publishers Ltd).
2. Best & Taylor: The Living Bodies, Asis Publishing House, Bombay.

Pharmacology & Toxicology:

1. Derasari & Brahmankan – Elements of Pharmacology.
2. B.C. Bose – T.B. of Pharmacology Scientific Book Agency, Calcutta.

3. Pharmacology & Pharmacothrspeutics Vols. I & I Santhoskar & Baudarkar.
4. Dr. Dandiya T.B. of Pharmacology.

Drug Store and Business Managements:

1. Remington Pharmaceutical Sciences Mock Publishers Co.
2. M.L. Shroff Professor of Pharmacy, Part – II Five Star Enterpraises, Calcutta.
3. Cosper D. Gunns, Tutorial Pharmacy, The Kothari Book Depot, Bombay.