Evaluation Scheme & Syllabus

of

DIPLOMA IN PHARMACY

(w.e.f. Academic Session 2014)

DEPARTMENT OF PHARMACY

INVERTIS UNIVERSITY - INVERTIS VILLAGE

Bareilly-Lucknow NH-24, Bareilly

PROGRAM OUTCOMES

DIPLOMA IN PHARMACY COURSE

- **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
- **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
- **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
- **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
- **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.
- **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
- **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
- **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
- **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
- **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

COURSE STRUCTURE
of
Diploma in Pharmacy (Part-I)
(2 Year Programme)

S. No	Course Code	Subject Name	Period (Hours)			Credit
			L	T	P	
1	DPH101	Pharmaceutics-I	3	-	-	3
2	DPH102	Pharmaceutical Chemistry-I	3	-	-	3
3	DPH103	Pharmacognosy	3	-	-	3
4	DPH104	Biochemistry & Clinical Pathology	2	-	-	2
5	DPH105	Human Anatomy & Physiology	3	-	-	3
6	DPH106	Health Education & Community Pharmacy	2	-	-	2
Practical						
1.	DPH151	Pharmaceutics-I	-	-	3	2
2.	DPH152	Pharmaceutical Chemistry-I	-	-	3	2
3.	DPH153	Pharmacognosy	-	-	3	2
4.	DPH154	Biochemistry & Clinical Pathology	-	-	3	2
5.	DPH155	Human Anatomy & Physiology	-	-	3	2
		Total	**16**		**15**	**26**

DPH101	**D.Pharm (Part-I)** **Pharmaceutics-I**	**75 Hrs**

LTPC
3003

Subject: Pharmaceutics Subject code: DPH101

Objective: This course is designed to impart a fundamental knowledge on the preparatory pharmacy and science of various unit operations used in pharmaceutical industry.

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. Calculations including conversion from one to another system. Percentage calculations and adjustments of products. Use of alligation method in calculations, Isotonic solutions.
4. Packing of Pharmaceuticals–Desirable features of a container–type of containers. Study of glass and plastics as materials for containers and rubber as material for closures-their merits and demerits. Introduction to aerosol packaging.
5. Size reduction Objectives, and factors affecting size reduction, methods of size reduction– Study of Hammer mill, Ball mill, Fluid Energy Mill and Disintegrator.
6. Size separation–Size separation by sifting. Official Standard for powders. Sedimentation methods of size separation. Construction and working of cyclone separator.
7. Mixing and Homogenization–Liquid mixing and powder mixing, Mixing of semisolids, Study of Silverson Mixer–Homogenizer, Planetary Mixer; Agitated powder mixer; Triple Roller Mill; Propeller Mixer, Colloid Mill and Hand Homogeniser. Double cone mixer.
8. Clarification and Filtration –Theory of filtration, Filter media; Filter aids and selection of filters. Study of the following filtration equipments–Filter Press, Sintered Filters, Filter Candles, Metafilter.
9. Extraction and Galenicals
    a. Study of percolation and maceration and their modification, continuous hot extraction– Applications in the preparation of tinctures and extracts.
    b. Introduction to Ayurvedic dosage forms.
10. Heat processes Evaporation–Definition Factors affecting evaporation –Study of evaporating still and Evaporating Pan.
11. Distillation–Simple distillation and Fractional distillation; Steam distillation and vacuum distillation. Study of vacuum 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 processes–Study of Tray Dryers: Fluidized Bed Dryer, Vacuum Dryer and Freeze Dryer.

13. Sterilization–Concept of sterilization and its differences from disinfection –Thermal resistance of micro–organisms. Detailed study of the following sterilization process.

i. Sterilization with moist heat.

ii. Dry heat sterilization,

iii. Sterilization by radiation,

iv. Sterilization by filtration and

v. Gaseous sterilization.

Aseptic techniques. Application of sterilization processes in hospitals particularly with reference to surgical dressings and intravenous fluids. Precautions for safe and effective handling of sterilization equipment.

14. Processing of Tablets-Definition; Different types of compressed tablets and their properties. Processes involved in the production of tablets; Tablets excipients; Defects in tablets. Evaluation of Tablets; Physical Standards including Disintegration and Dissolution. Tablet coating–sugar coating; film coating, enteric coating and microencapsulation (Tablet coating may be dealt in an elementary manner.)

15. Processing of Capsules–Hard and soft gelatin capsules; different sizes capsules; filling of capsules; handling and storage of capsules, Special applications of capsules.

16. Study of immunological products like sera vaccines, toxoids & their preparations.

REFERENCE BOOKS (LATEST EDITION)

1. Remington's Pharmaceutical Sciences.
2. The Extra Pharmacopoeia-Martindale.

DPH151	**D.Pharm (Part-I)** **Pharmaceutics-I**	**100 Hrs**

LTPC
0032

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

1.	Aromatic water	3
2.	Solutions	4
3.	Spirits	2
4.	Tinctures	4
5.	Extracts	2
6.	Creams	2
7.	Cosmetic preparations	3
8.	Capsules	2
9.	Tablets	2
10.	Preparations involving sterilization	2
11.	Ophthalmic preparations	2
12.	Preparations involving aseptic techniques	2

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

- Know the history of profession of pharmacy
- Understand the basics of different dosage forms and Preparation of various conventional dosage forms.
- To know various unit operations used in Pharmaceutical industries.
- To understand the material handling techniques.
- To perform various processes involved in pharmaceutical manufacturing process.

Course Structure: Diploma in Pharmacy

DPH102	**D.Pharm (Part-I)** **Pharmaceutical Chemistry-I**	**75 Hrs**

LTPC
3002

Subject: Pharmaceutical Chemistry-I Subject Code: DPH-102

Objective: Subject is designed to impart understanding of inorganic compounds of different pharmaceutical classes and radiopharmaceuticals. The subject emphasizes on the quality control of pharmaceuticals.

1. General discussion 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*, calcium hydroxide, hydrochloric acid, strong ammonium hydroxide, sodium hydroxide and official buffers.

(B) Antioxidants—hypophosphorous acids, sulphur dioxide, sodium bisulphite, sodium metabisulphite, sodium thiosulphate, nitrogen and sodium nitrite

(C) Gastrointestinal agents—

(i) Acidifying agents—dilute hydrochloric acid.

(ii) Antacids—sodium bicarbonate, aluminium hydroxide gel, aluminium phosphate, calcium carbonate, magnesium carbonate, magnesium trisilicate, magnesium oxide, combinations of antacid preparations.

(iii) Protectives and adsorbents—bismuth subcarbonate and kaolin.

(iv) Saline cathartics—sodium potassium tartrate and magnesium sulphate.

(D) Topical agents—

(i) Protectives—talc, zinc oxide, calamine, zi nc stearate, titanium dioxide, silicone polymers.

(ii) Antimicrobials and astringents—hydrogen peroxide*, potassium permanganate, chlorinated lime, Iodine, solutions of iodine, povidone iodine, boric acid, borax, silver nitrate, mild silver protein, mercury, yellow mercuric oxide, ammoniated mercury.

(iii) Sulphur and its compounds—sublimed sulphu r, precipitated sulphur, selenium sulfide.

(iv) Astringents—alum and zinc sulphate.

(E) Dental products—sodium fluoride, stannous fluoride, calcium carbonate, sodium metaphosphate, dicalcium phosphate, strontium chloride, zinc chloride.

(F) Inhalants—oxygen, carbon dioxide, nitrous oxide.

(G) Respiratory stimulants—ammonium carbonate.

(H) Expectorants and emetics—ammonium chloride*, potassium iodide, antimony potassium tartrate.

(I) Antidotes—sodium nitrite.

2. Major intra and extracellular electrolytes—
   (A) Electrolytes used for replacement therapy—sodium chloride and its preparations, potassium chloride and its preparations.
   (B) Physiological acid-base balance and electrolytes used—sodium acetate, potassium acetate, 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; ferrous sulfate and calcium gluconate.
4. Radio pharmaceuticals and contrast media-radioactivity-alpha; beta and gamma radiations, biological effects of radiations, measurement of radioactivity, G.M. counter; radio isotopes—their uses, storage and precautions with special reference to the official preparations. Radio opaque contrast media—barium sulfate.
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, chlorides, sulfates, iron and heavy metals.
6. Identification tests for cations and anions as per Indian Pharmacopoeia.

REFERENCE BOOKS (LATEST EDITION)

1. Pharmacopoeia of India, Govt. of India, Ministry of Health, Delhi.
2. Beckett A.H. and Stenlake J.B., Practical Pharmaceutical Chemistry, Part-I, The Athlene Press University of London.
3. Chatten L.G., Pharmaceutical Chemistry, Vol. I & II, Marsccel Dekker, New York.
4. L. M. Arthadon, Benlty, T. B. of Pharmaceutical Chemistry, British Press.
5. Block J., Roche E.B., Sonie T.O., Wilson C.O., Inorganic Pharmaceutical chemistry, Lea & Febiger, Philadelphia, PA.
6. Atherden L.M, Bentley and Driver's Text Book of Pharmaceutical Chemistry, Oxford University Press, London.
7. Jeffery G.H., Bassett J., Mendham J., Denney R.C., Volgel's Text book of quantitative chemical analysis, E.L.B.S. London.
8. Disher L. A., Modern Inorganic Pharmaceutical Chemistry.

DPH152	**D.Pharm (Part-I)** **Pharmaceutical Chemistry-I**	**75 Hrs**

LTPC
0032

1. Identification tests for inorganic compounds particularly drugs and pharmaceuticals.
2. Limit test for chlorides, sulfates, arsenic, iron and heavy metals.
3. Assay of inorganic pharmaceutical (involving each of the following methods) compounds marked with (*) under theory.
   (a) Acid-base titrations (at least 3)
   (b) Redox titrations (one each of permanganometry and iodimetry)
   (c) Precipitation titrations (at least 2)
   (d) Complexometric titrations (calcium and magnesium).

Course Outcome: After completion of the course the student shall be able to:

1. Describe important physical and chemical properties, medicinal and pharmaceutical uses, storage conditions and chemical incompatibility of acid bases and buffers, gastrointestinal agents, antioxidants, topical agents, dental products, inhalants, respiratory stimulants, expectorants, emetics and antidotes.
2. Tell the major intra and extracellular electrolytes
3. Understand various inorganic official compounds
4. Understand radiopharmaceuticals
5. Perform Quality control of drugs and pharmaceuticals
6. Learn and perform Identification tests for cations and anions as per Indian Pharmacopoeia.

Course Structure: Diploma in Pharmacy

DPH103	**D.Pharm (Part-I)** **Pharmacognosy**	**75 Hrs**

LTPC
3003

Subject: Pharmacognosy Subject Code: DPH-103

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

1. Carry out isolation and identification of Phytoconstituents.
2. To study modern extraction techniques of Phytoconstituents.
3. To have knowledge about various active constituents present in plants.
4. To study about various drugs used for treatment of disease.

1. Definition, history and scope of pharmacognosy including indigenous system of medicine.
2. Various systems of classification of drugs of natural origin.
3. Adulteration and drug evaluation; significance of pharmacopoeial 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 constituents including tests wherever applicable and therapeutic efficacy of following categories of drugs.
   (a) Laxatives—aloes, rhubarb, castor oil, ispaghula, senna.
   (b) Cardiotonics—digitalis, arjuna.
   (c) Carminatives & G.I. regulators—umbelliferous fruits-coriander, fennel, ajowan, cardamom, ginger, black pepper, asafoetida, nutmeg, cinnamon, clove.
   (d) Astringents—catechu.

(e) Drugs acting on nervous systems—hyoscyamus, belladonna, aconite, ashwa gandha, ephedra, opium, cannabis, nux vomica.

(f) Anithypertensives—rauwolfia.

(g) Antitussives—vasaka, tolu balsam, tulsi.

(h) Antirheumatics—guggal, colchicum.

(i) Antitumour—vinca.

(j) Antileprotics—chaulmoogra oil.

(k) Antidiabetics—pterocarpus, gymnema sylvestro.

(l) Diuretics—gokhru, punarnava.

(m) Antidysenterics—ipecacuanha.

(n) Antiseptics and disinfectants—benzoin, myrrh, neem, curcuma.

(o) Antimalarials—cinchona.

(p) Oxytocics—ergot.

(q) Vitamins—shark liver oil and amla.

(r) Enzymes—papaya, diastase, yeast.

(s) Perfumes and flavouring agents—peppermint oil, lemon oil, orange oil, lemon grass oil, sandalwood.

(t) Pharmaceutical aids—honey, arachis oil, starch, kaolin, pectin, olive oil, lanolin,

beeswax, acacia, tragacanth, sodium alginate, agar, guar gum, gelatin.

(u) Miscellaneous—liquorice, garlic, picrohiza, dios corea, linseed, shatavari, shankpushpi, pyrethrum, tobacco.

6. Collection and preparation of crude drugs from the market as exemplified by ergot, opium, rauwolfia, digitalis, senna.
7. Study of source, preparation and identification of fibres used in sutures and surgical dressings—cotton, silk, wool and regenerated fibres.
8. Gross anatomical studies of senna, datura, cinnamon, cinchona, fennel, clove, ginger, nuxvomica and ipecacuanha.

REFERENCE BOOKS (LATEST EDITION)

1. Kokate C. K., Practical Pharmacognosy, Vallabh Prakashan, Delhi.
2. Kokate C. K., Purohit A. P. and Gokhale S. B., Pharmacognosy , Nirali Prakashan, Pune.
3. Tylor V. E., Brady L. R. and Robbers J. E., Pharmacognosy 1981, Learned Febiger, Philadelphe, U. S. A.
4. Trease G. E. Pharmacognosy and Evans W. C., Baillers Tindall, London.
5. Wallis T. E. Pharmacognosy, J. A. Churchill.

DPH153	**D.Pharm (Part-I)** **Pharmacognosy**	**75 Hrs**

LTPC
0032

1. Identification of drugs by morphological characters.
2. Physical and chemical tests for evaluation of drugs wherever applicable.
3. Gross anatomical studies (t.s.) of the following drugs : senna, datura, cinnamon, cinchona, coriander, fennel, clove, ginger, nuxvomica, ipecacuanha.
4. Identification of fibers and surgical dressings.

Course Outcome:

1. Information about the use of medicinal plants as a source of drugs for treatment of disease.
2. Helps in developing the procedure for adulteration and evaluation of drugs.
3. Information about classification of drugs.
4. Information about mechanism of action of drugs used for treatment of disease.

DPH104	D.Pharm (Part-I) Biochemistry and Clinical Pathology	50 Hrs

LTPC
2002

Objectives: 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.

1. Introduction to biochemistry.
2. Brief chemistry and role of carbohydrates, classification, qualitative tests. Diseases related to carbohydrate metabolism.
3. Brief chemistry and role of proteins, polypeptides and amino acids, classification, qualitative tests, biological value, deficiency diseases.
4. Role of minerals and water in life processes.
5. Brief chemistry and role of lipids, classification, qualitative tests. Diseases related to lipid metabolism.
6. Brief chemistry and role of vitamins and coenzymes.
7. Enzymes—brief concept of enzymatic action and factors affecting it, therapeutic and pharmaceutical importance.
8. Brief concept of normal and abnormal metabolism of proteins, carbohydrates and lipids.
9. Introduction 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.

REFERENCE BOOKS (LATEST EDITION)

1. Lehninger A. L., Principles of Biochemistry, CBS Publishers and Distributors, New Delhi.
2. Stryer L., Biochemistry, W H Freeman and Company, San Francisco.
3. A.V.S.S. Rama Rao, Text book of Biochemistry.
4. Conn E. E. and Stumpf P. K., Outlines of Biochemistry, John Wiley and Sons, New York.
5. Harrow B. and Mazur A., Textbook of Biochemistry, W. B. Saunders Co., Philadelphia.
6. Jayraman J., Laboratory Manual in Biochemistry, Wiley Eastern Limited, New Delhi.
7. Martin D. W., Mays P. A. and Redwell V. M., Harpers Biochemistry, Lange Medical Publications.

8. Mussay R. K., Granner D. K., Mayous P. A. and Rodwell Harpers Biochemistry, Prentice-Hall International, Inc.
9. Plumer D. T., An Introduction to Practical Biochemistry, Tata MacGraw Hill, New Delhi.

DPH154	D.Pharm (Part-I) Biochemistry and Clinical Pathology	75 Hrs

LTPC
0032

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 faeces (microscopic & staining).
4. Practice in injecting drugs by intramuscular, subcutaneous and intravenous routes, withdrawal of blood samples.

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

1. To understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.

2.To understand the metabolism of nutrient molecules in physiological and pathological conditions.

DPH105	**D.Pharm (Part-I)** **Human Anatomy and Physiology**	**75 Hrs**

LTPC
3003

Subject: Human Anatomy & Physiology SUBJECT CODE-DPH 105

Objective: 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.

1. Scope of anatomy and physiology, definition of various terms used in anatomy.
2. Structure of cell, function of its components with special reference to mitochondria and microsomes.
3. Elementary tissues of the body, i.e. epithelial tissue, muscular tissue, connective tissue and nervous tissue.
4. Structure and function of skeleton, classification of joints and their function, joint 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 parts of the heart, arterial and venous system with special reference to the names and positions of main arteries and veins, blood pressure 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 neuromuscular 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, smell, ear, eye and skin. Physiology of pain.
13. Digestive system—names of various parts of digestive system and their functions. Structure and functions of liver, physiology of digestion and absorption.
14. Endocrine glands and hormones. Locations of glands, their hormones and functions—pituitary, thyroid, adrenal and pancreas.

15. Reproductive system—physiology and anatomy of reproductive system.

REFERENCE BOOKS (LATEST EDITION)

1. Derashari and Gandhi; Human Anatomy and physiology; B.S. Shah Prakashan.
2. C.C. Chatterjee; Human Physiology; Medical Alied Agency, Calcutta.
3. Goyal, Bhatt and Kumar; Basics of Health Education and Community Pharmacy; B.S. Shah Prakashan.
4. Warwick & Williman Longman; Gray's Anatomy.
5. Sahana's Text Book of Anatomy.
6. Willium and Wilkins, Baltimore Best and Taylor's Physiological Basis of Medical Practice.
7. Difore Lea SH and Febiger, Atlas of Normal Histology, Philadephia.
8. Ganong WF, Review of Medical Physiology, Prentice Hall International.
9. Chourasia B.D.; Human Anatomy, Regional and Applied. Part I, II & III; CBS Publishers and Distributor, New Delhi.
10. Gyuton A.C., Half J.E.;Text Book of Medical Physiology; WB Sannders Company.
11. Subhash Shaliya; Human Physiology; CBS Publishers and Distributors.
12. Keel C.A., Neil E and Joels N.; Samson Wright's Applied Physiology; Oxford University Press.
13. MC Naught A.B. and Callander R, Churchill Livingstone; Illustrated Physiology.
14. Ranade V.G.; Text Book of Practical Physiology; Pune Vidyarthi Griha Prakashan, Pune.
15. Tortora G.J. and Anagnodokos N.P.; Principles for Anatomy and Physiology; Harper and Row Publishers N.Y.
16. Vander A.J. Shermati J.H. and Luciano D.S.; Human Physiology; Tata Mcgraw Hill Publishing Co. New Delhi.
17. Goyal R.K.; A Text Book of Experimental Physiology; B.S. Shah Prakashan.

DPH155	D.Pharm (Part-I) Human Anatomy and Physiology	50 Hrs

LTPC
0032

1. Study of the human skeleton.
2. Study with the help of charts and models, of the following system and organs:
   (a) Digestive system (b) Respiratory system
   (c) Cardiovascular system (d) Urinary system
   (e) Reproductive system (f) Nervous system
   (g) Eye (h) Ear
3. Microscopic examination of ephithelial 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 time of blood, erythrocyte sedimentation rate and haemoglobin value.
6. Recording of body temperature, pulse, heart rate, blood pressure and ECG.

Coarse outcome:

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.
2. 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
6. Perform the hematological tests like blood cell counts, hemoglobin estimation, bleeding/ clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.

DPH106	D.Pharm (Part-I) Health Education and Community Pharmacy	50 Hrs

LTPC
2002

Subject: Health Education & Community Pharmacy Subject Code-DPH106

Objectives: The main purpose of this particular subject is to make the students understand about the health and hygiene. About how to tae are of their health and ways to protect their health and body from the harmful foreign organisms. This subject includes the knowledge of the medicines about how to store the medicine and how to establish any drug store with a registered pharmacist.

1. Concept of health—definition of physical health, mental health, social health, spiritual 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 foods, requirements, diseases induced due to deficiency of proteins, vitamins and minerals—treatment and prevention.
3. Demography and family planning—demography cycle, fertility, family planning, contraceptive methods, behavioral methods, natural family planning methods, chemical methods, mechanical methods, hormonal contraceptives, population problem of India.
4. First aid—emergency treatment in shock, snake bite, burns, poisoning, heart disease, fractures and resuscitation methods. Elements of minor 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 entomology, arthropod borne diseases and their control, rodents, animals and diseases.
6. Fundamental principles of microbiology—classification of microbes, isolation, staining techniques of organisms of common diseases.
7. Communicable disease—causative agents, modes of transmission and prevention.
   (a) Respiratory infections—chicken pox, measles, influenza, diptheria, whooping cough and tuberculosis.
   (b) Intestinal infections—poliomyelitis, hepatitis, cholera, typhoid, food poisoning, hookworm infection.
   (c) Arthropod borne infections—plague, malaria, filariasis.
   (d) Surface infections—rabies, trachoma, tetanus, leprosy.
   (e) Sexually transmitted diseases—syphilis, gonorrhoea, AIDS
8. Non-communicable diseases—causative agents, prevention, care and control. Cancer, diabetes, blindness, cardiovascular diseases.

9. Epidemiology—scope, methods, uses, dynamics of disease transmission, immunity and immunisation, immunological products and their dose schedule. Principles of disease control and prevention, hospital acquired infection, prevention and control. Disinfection, types of disinfection procedures, for faeces, urine, sputum, room linen, dead bodies and instruments.

REFERENCE BOOKS (LATEST EDITION)

1. N.S. Parmar; Health Education and Community Pharmacy; CBS Publishers.

Course outcome:

Upon completion of this course the student should be able to understand the following points-

- Understand the basic knowledge about the drugs and dosage forms.
- Students is able to understand the proper way to establish and maintain a drug store.
- Students and made to understand the role of a community pharmacist and the basic knowledge of a proper setup of the medicines.
- Students are made tounderstand about the ways to keep themselves fit by maintaining their personal hygiene and the use alcohol based soaps, sanitizer and wipes to keep them safe from germs.

COURSE STRUCTURE
of
Diploma in Pharmacy (Part-II)
(2 Year Programme)

S. No	Course Code	Subject Name	Period (Hours)			Credit
			L	T	P	
1	DPH 201	Pharmaceutics-II	3	-	-	3
2	DPH202	Pharmaceutical Chemistry-II	3	-	-	3
3	DPH203	Pharmacology & Toxicology	3	-	-	3
4	DPH204	Pharmaceutical Jurisprudence	2	-	-	2
5	DPH205	Drug Store and Business Management	3	-	-	3
6	DPH206	Hospital & Clinical Pharmacy	3	-	-	3
Practical						
1	DPH 251	Pharmaceutics-II	-	-	3	2
2	DPH252	Pharmaceutical Chemistry-II	-	-	3	2
3	DPH253	Pharmacology & Toxicology	-	-	3	2
4	DPH256	Hospital & Clinical Pharmacy	-	-	3	2
		Total	**17**		**12**	**25**

COURSE STRUCTURE
of
Diploma in Pharmacy (Part-II)
(2 Year Programme)

S. No	Course Code	Subject Name	Period (Hours)			Credit
			L	T	P	
1	DPH 201	Pharmaceutics-II	3	-	-	3
2	DPH202	Pharmaceutical Chemistry-II	3	-	-	3
3	DPH203	Pharmacology & Toxicology	3	-	-	3
4	DPH204	Pharmaceutical Jurisprudence	2	-	-	2
5	DPH205	Drug Store and Business Management	3	-	-	3
6	DPH206	Hospital & Clinical Pharmacy	3	-	-	3
Practical						
1	DPH 251	Pharmaceutics-II	-	-	3	2
2	DPH252	Pharmaceutical Chemistry-II	-	-	3	2
3	DPH253	Pharmacology & Toxicology	-	-	3	2
4	DPH256	Hospital & Clinical Pharmacy	-	-	3	2
		Total	**17**		**12**	**25**

DPH201	**D.Pharm (Part-II)** **Pharmaceutics-II**	**75 Hrs**

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SUBJECT: PHARMACEUTICS –II SUBJECT CODE-DPH-201

Objectives: This course is designed to impart a fundamental knowledge of pharmacy and various pharmaceutical dosage forms on the performance of the drug product

5. Dispensing Pharmacy:

Prescriptions: Reading and understanding of prescription; latin terms commonly used (detailed study is not necessary), modern methods of prescribing, adoption of metric system, calculations involved in dispensing.

- **Incompatibilities in prescriptions:** Study of various types of incompatibilities—physical, chemical and therapeutic.
- **Posology:** Dose and dosage of drugs, factors influencing dose, calculations of doses on the basis of age, sex and surface area, veterinary doses.

vi. Dispensed Medications:

(Note: A detailed study of the following dispensed medication is necessary. Methods of preparation with theoretical and practical aspects, use of appropriate containers and closures, special labeling requirements and storage conditions should be highlighted).

17. Powders: Types of powders, advantages and disadvantages of powders, granules, cachets and tablet triturates. Preparation of different types of powders encountered in prescriptions. Weighing methods, possible errors in weighing, minimum weighable amount and weighing of a material below the minimum weighable amount, geometric dilution and proper usag

e and care of dispensing balance.

18. Liquid oral dosage forms:

3. Monophasic—theoretical aspects including commonly used vehicles, essential adjuvants like stabilizers, colourants and flavours, 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 mucous membranes**
Mixtures and concentrates	Gargles
Syrups	Mouth washes , throat paint, douches
Elixirs	Ear drops, Nasal drops and spray liniments, lotions

Invertis Institute of Pharmacy, Invertis University, Bareilly, U.P

2. Biphasic liquid dosage forms:

(A) Suspensions (elementary study)—suspensions containing diffusible solids and liquids and their preparations. 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) Emulsions—types of emulsions, identification of emulsion system, formulation of emulsions, selection of emulsifying agents. Instabilities in emulsions. Preservation of emulsions.

(iv) Semi-solid dosage forms:

i 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.

A Jellies—an introduction to the different types of jellies and their preparation.

(J) An elementary study of poultice.

i Suppositories and passaries—their relative meri ts and demerits, types of suppositories, suppository bases, classification, properties. Preparation and packing of suppositories. Use of suppositories for drug absorption.

7. Dental and cosmetic preparations:

Introduction to dentifrices, facial cosmetics, d eodorants, antiperspirants, shampoos, hair dressings and hair removers.

9. Sterile dosage forms:

Parenteral dosage forms—definition, general requirements for parenteral dosage forms, types of parenteral formulations, vehicles, adjuvants, processing, personnel, facilities and quality control. Preparation of intravenous fluids and admixtures—total parenteral nutrition, dialysis fluids.

& Sterility testing, particulate matter monitoring, faulty seal packaging.

Ophthalmic products—study of essential characteristics of different ophthalmic preparations. Formulation additives, special precautions in handling and storage of ophthalmic products.

REFERENCE BOOKS (LATEST EDITION)

6. Indian Pharmacopoeia.
7. British Pharmacopoeia.
8. National Formularies (N.F.I., B.N.P.)
9. Martindale's Extra pharmacopoeia.
10. Carter S. J., Cooper Gunn's Dispensing for Pharmaceutical Students, CBS Publishers, Delhi.
11. Remington's The Science and Practice of Pharmacy, Mack Publishing Co. Easton, Pennsylvania.
12. The British Pharmaceutical Codex, The Pharmaceutical Press, London, Convention, Mack Pub Co., Easton PA.

2 Hoover J.E., Dispensing of Medication, Mack Publishing Co., Easton, Pennsylvania.

3 Martin E. W., Dispensing of Medication, Mack Publishing Co., Easton PA.

DPH251	**D.Pharm (Part-II)** **Pharmaceutics-II**	**100 Hrs**

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Dispensing of at least 100 products covering a wide range of preparations such as mixtures, emulsions, lotions, liniments, ENT preparations, ointments, suppositories, powders, incompatible prescriptions etc.

Course Outcome:

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

- To Know the various pharmaceutical dosage forms and their manufacturing techniques.
- To Understand the basics of pharmaceutical calculations and factors influencing dose of drug..
- To Formulate liquid and semisolid dosage forms and evaluate them for their Quality.

Course Structure: Diploma in Pharmacy

DPH202	**D.Pharm (Part-II)** **Pharmaceutical Chemistry-II**	**100 Hrs**

LTPC
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SUBJECT: PHARMACEUTICAL CHEMISTRY-II SUBJECT CODE-DPH202

Objective: This subject deals with classification and nomenclature of simple organic compounds, intermediates forming in reactions, important physical properties, reactions and methods of preparation of these compounds. The syllabus also emphasizes on pharmaceutical organic compounds with nomenclature and their properties.

1. Introduction to the nomenclature of organic chemical systems with particular reference to heterocyclic system containing upto 3 rings.

2 The chemistry of following pharmaceutical organic compounds covering their nomenclature, chemical structure, uses and the important physical and chemical properties (chemical structure of only those compounds marked with asterisk(*).

The stability and storage conditions and the different types of pharmaceutical formulations of these drugs and their popular brand names.

Antiseptics and disinfectants—proflavine*, benzalkoniumchloride, cetrimide, chlorocresol*, chloroxylene, formaldehyde solution, hexachlorophene, liquified phenol, nitrofurantoin.

Sulfonamides—sulfadiazine, sulfaguanidine*, phthalylsulfathiazole, succinylsulfathiazole, sulfadimethoxine, sulfamethoxypyridazine, sulfamethoxazole, co-trimoxazole, sulfacetamide*. Antileprotic drugs—clofazimine, thiambutosine, dapsone*, solapsone.

Anti-tubercular drugs—isoniazid*, PAS*, streptomycin, rifampicin, ethambutol*, thiacetazone, ethionamide, cycloserine, pyrazinamide*.

Antiamoebic and anthelminitic drugs—emetine, metronidazole*, halogenated hydroxyquinolines, diloxanide furoate, paromomycin, piperazine*, mebendazole, D.E.C.*.

Antimalarial drugs—chloroquine*, amodiaquine, primaquine, proguanil, pyrimethamine*, quinine, trimethoprim.

Antibiotics—benzyl penicillin*, phenoxy methyl penicillin*, benzathine penicillin, ampicillin*, cloxacillin, carbenicillin, gentamicin, neomycin, erythromycin, tetracycline, cephalexin, cephaloridine, cephalothin, griseofulvin, chloramphenicol.

Antifungal agents—undecyclenic acid, tolnaftate, nystatin, amphotericin B, hamycin.

Tranquilizers—chlorpromazine*, prochlorperazine, trifluoperazine, thiothixene, haloperidol*, triperiodol, oxypertine, chlordizepoxide, diazepam* lorazepam, meprobamate. Hypnotics—phenobarbitone*, butobarbitone, cyclobarbitone, nitrazepam, glutethimide*, methyprylone, paraldehyde, triclofos sodium.

General anaesthetics—halothane*, cyclopropane*, diethyl ether*, methohexital sodium, thiopental sodium, trichloroethylene.

Antidepressant drugs—amitriptyline, nortryptyline, imipramine*, phenelzine, tranylcypromine. Analeptics—theophylline, caffeine*, coramine*, dextro-amphetamine.

Adrenergic drugs—adrenaline*, noradrenaline, isoprenaline*, phenylephrine, salbutamol, terbutaline, ephedrine*, pseudoephedrine.

Adrenergic antagonist—tolazoline, propranolol*, practolol.

Cholinergic drugs—neostigmine*, pyridostigmine, pralidoxime, pilocarpine, physostigmine*. Cholinergic antagonists—atropine*, hyoscine, homatropine, propantheline*, benztropine, tropicamide, biperiden*.

Diuretic drugs—furosemide*, chlorothiazide, hydrochlorothiazide* benzthiazide, urea*, mannitol*, ethacrynic acid.

Cardiovascular drugs—ethyl nitrite*, glyceryl trinitrate, alpha methyl dopa, guanethidine, clofibrate, quinidine.

Hypoglycemic agents—insulin, chlorpropamide*, tolbutamide, glibenclamide, phenformin*, metformin.

Coagulants and anticoagulants—heparin, thrombin, menadione*, bishydroxycoumarin, warfarin sodium.

Local anaesthetics—lignocaine*, procaine*, benzocaine,

Histamine and antihistaminic agents—histamine, diphenhydramine*, promethazine, cyproheptadine, mepyramine, pheniramine, chlorpheniramine*.

Analgesics and antipyretics—morphine, pethidine*, codeine, methadone, aspirin*, paracetamol*, analgin, dextropropoxyphene, pentazocine.

Nonsteroidal antiinflammatory agents—indomethacin*, phenylbutazone*, oxyphenbutazone, ibuprofen.

Thyroxine and antithyroids—thyroxine*, methimazloe, methylthiouracil, propylthiouracil.

Diagnostic agents—iopanoic acid, propyliodone, sulfobrompthalein, sodium indigotindisulfonate, indigocarmine, evans blue, congo red, fluorescein sodium.

*Anticonvulsants, cardiac glycosides, antiarrhythmics, antihypertensives and vitamins.

Steroidal drugs—betamethasone, cortisone, hydrocortisone, prednisolone, progesterone, testosterone, oestradiol, nandrolone.

Antineoplastic drugs—actinomycin, azathioprine, busulphan, chloramubucil, cisplatin, cyclophosphamide, daunorubicin hydrochloride, fluorouracil, mercaptopurine, methotrexate, mytomycin.

REFERENCE BOOKS (LATEST EDITION)

2 Pharmacopoeia of India.

3 British Pharmaceutical codex,

4 Martindale’s Extra pharmacopoeia.

DPH252	D.Pharm (Part-II) Pharmaceutical Chemistry-II	75 Hrs

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2 Systematic qualitative testing of organic drugs involving solubility determination, melting point and/or boiling point, detection of elements and functional groups (10 compounds).

3 Official identification tests for certain groups of drugs included in the I.P., like barbiturates, sulfonamides, phenothiazines, antibiotics etc. (8 compounds).

4 Preparation of three simple organic preparations.

Course Outcome: Upon completion of the course the student shall be able to

1. Write the structure, name and stability and storage condition of the organic compound.
2. To prepare medicinal drugs and Know their popular brand names.
3. To account for Physical/Chemical properties, uses of compounds.
4. To identify/confirm the identification of organic compound.

Course Structure: Diploma in Pharmacy

DPH203	**D.Pharm (Part-II)** **Pharmacology and Toxicology**	**75 Hrs**

LTPC
300 3

SUBJECT: PHARMACOLOGY SUBJECT CODE: DPH203

Objectives: This subject is intended to impart the fundamental knowledge on various aspects(classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition, emphasis on the basic concepts of bioassay.

9. Introduction to pharmacology, scope of pharmacology.
10. Routes of administration of drugs, their advantages and disadvantages.
11. Various processes of absorption of drugs and the factors affecting them. Metabolism, distribution and excretion of drugs.
12. General mechanism of drugs action and the factors which modify drugs action.
13. Pharmacological classification of drugs. The discussion of drugs should emphasize the following aspects:

a Drugs acting on the central nervous system:

General anaesthetics, adjunction to anaesthesia, intravenous anesthetics.

Analgesic, antipyritic and non-steroridal antiin flammatory drugs, narcotic analgesics, antirheumatic and antigout remedies, sedatives and hypnotics, psychopharmacological agents, anti-convulsants, analeptics.

Centrally acting muscle re laxants and antiparkinsonism agents.

Local anaesthetics.

Drugs acting on autonomic nervous system.

(a) Cholinergic drugs, anticholinergic drugs, anticholinesterase drugs.

Adrenergic drugs and adrenergic receptor blockers.

Neurone blockers and ganglion blockers.

Neuromuscular blockers, drugs used in myasthenia gravis.

Drugs acting one eye, mydriactics, drugs used in glaucoma.

5. Drugs acting on respiratory sy stem-respiratory stimulants, bronchodilators, nasal decongestants, expectorants and antitussive agents.

Antacids, physiological role of histamine and serotonin, histamine and antihistamines, prostaglandins.

10. Cardiovascular drugs, cardiotonics, antiarrhythmic agents, antianginal agents, antihypertensive agents, peripheral vasodilators and drugs used in atherosclerosis.

(viii) Drugs acting on the blood and blood forming orga ns. Haematinics, coagulants and anticoagulants, haemostatics, blood substitutes and plasma expanders.

(a) Drugs affecting renal function—diuretics and antidiuretics.

10. Hormones and hormone antagonists—hypoglycemic agents, antithyroid drugs, sex hormones and oral contraceptives, corticosteroids.

(xi) Drugs acting on digestive system—carminatives, digestants, bitters, antacids and drugs used in peptic ulcer, purgatives, and laxatives, antidiarrohoeals, emetics, antiemetics, antispasmodics.

5. Chemotherapy of microbial disease: urinary antiseptics, sulfonamides, penicillins, streptomycin, tetracyclines and other antibiotics, antitubercular agents, antifungal agents, antiviral drugs, antileprotic drugs.
6. Chemotherapy of protozoal diseases, anthelminitc drugs.
7. Chemotherapy of cancer.
8. Disinfectants and antiseptics.

A detailed study of the action of drugs on each organ is not necessary.

REFERENCE BOOKS (LATEST EDITION)

15. Goyal R.K., Derasari & Gandhi's Elements of Pharmacology, B. S. Shah Prakashan.
16. Satoskar & Bhandarkar, Pharmacology & Pharmacotherapeutics I & II, Popular Prakashan, Bombay.
17. Applied Therapeutics: The clinical use of Drugs, applied Therapeutics, Inc.
18. Crossland J. and Thomsen J.H.; Essential of Pharmacology; Harper & Raw Publishers NY.
19. Barar F. S. K., Essentials of Therapeutics; Interprint New Delhi.
20. Craig C. R. & Stizel R. R., Modern Pharmacology, Little Brown and Company.
21. Davidson's Principles and Practice of Medicine, ELBS/Churchill Livingstone.
22. J.G.Hardman, L.E., Limbird, P.B.Molinoss, R.W.Rudden & A. G. Gil, Goodman & Gilmans, The Pharmacological basis of Therapeutics, Pergamon Press.
23. Herindal E. T. & Hirschman J.L., Willams and Wilkins, Clinical Pharmacy and therapeutics.
24. Katzung B. G., Basic and Clinical Pharmacology, Prentice Hall International.
25. Lawrence D.R. and Bennet P. N., Clinical Pharmacology; Churchill Livingstone.
26. Myeek M. J., Gertner S. B. & Perper M. M., Pharmacology Lippincatt's Illustrated Reviews, Lippinocott Company, Philadelphia.
27. Panl L., Chapmom and Hall, Principles of Pharmacology.
28. Dipiro, J.L.Elseuier, A Pathophysiological Approach: Phermacotherpay.
29. Rang M.P., Dale M.M., Riter J.M.,Pharmacology, Churchill Liningstone.
30. Robbinson S. L. and Kumar V.; Basic Pathology, W. B. Saunders Co.
31. Theoharides T. C., Pharmacology; Little Brown & Co.
32. Turner; Screening of drugs.
33. B. C. Bose, Pharmacology

14. James crossland, Levi's Pharmacology
15. Ghosh, Pharmacology materia medical and therapeutics.
16. Goyal R. K., Bhat R. and Burande M. K., Text Book of Clincal Pharmacy, Shah Publication.
17. Goyal R. K., Text Book of Experimental Pharmacology, Shah Publication.
18. Ghosh M.N., Fundamentals of Experimental Pharmacology, Scientific Book Agency, calcutta.
19. Kulkarni S. K., Hand Book of Experimental Pharmacology, Vallabh Prakashan, delhi.
20. Sharma V.N., Essentials of Pharmacology, CBS Publishers, New Delhi.

DPH253	**D.Pharm (Part-II)** **Pharmacology and Toxicology**	**50 Hrs**

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

18. Effect of potassium and calcium, acetylcholine and adrenaline on frog's heart.
19. Effect of acetylcholine on rectus abdominis muscle of frog and guinea pig ileum.
20. Effect of spasmogens and relaxants on rabbits intestine.
21. Effect of local anaesthetics on rabbit cornea.
22. Effect of mydriatics and miotics on rabbit eye.
23. To study the action of strychnine on frog.
24. Effect of digitalis on frogs heart.
25. Effect of hypnotics in mice.
26. Effect of convulsants and anticonvulsants in mice or rats.
27. Test for pyrogens.
28. Taming and hypnosis potentiating effect of chlorpormazine in mice/rats.
29. Effect of diphenhydramine in experimentally produced asthma in guinea pigs.

Course outcome:

Upon completion of this course the student should be able to

- Understand the mechanism of drug action and its relevance in the treatment of different diseases
- Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
- Demonstrate the various receptor actions using isolated tissue preparation
- Appreciate correlation of pharmacology with related medical sciences

DPH204	D.Pharm (Part-II) Pharmaceutical Jurisprudence	50 Hrs

LTPC
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SUBJECT: PHARMACEUTICAL JURISPRUDENCE SUBJECT CODE-DPH204

Objectives: This subject is intended to impart the fundamental knowledge regarding the laws regulating the profession of pharmacy in India. It includes all the acts and rules thereof mentioned in the constitution of India. Drug and Cosmetic act and rules Pharmacy act, Medical termination of pregnancy act, Magic remedies act.

3. 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.
4. Principles and significance of professional ethics. Critical study of the code of pharmaceutical ethics drafted by Pharmacy Council of India.
5. Pharmacy Act, 1948—the general study of the Pharmacy Act with special reference to education regulations, working of state and central councils, constitution of these councils and functions, registration procedures under the Act.
6. The Drugs and Cosmetics Act, 1940—general study of the Drugs and Cosmetics Act and the rules there under. Definitions and salient features related to retail and wholesale distribution of drugs. The powers of inspectors, Sampling 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, C1, F, G, J, H, P and X and salient features of labeling and storage conditions of drugs.
7. The Drugs and Magic Remedies (Objectionable Advertisement) Act, 1954—general study of the act, objectives, special reference to be laid on advertisements, magic remedies and objectionable and permitted advertisements, diseases which cannot be claimed to be cured.
8. Narcotic Drugs and Psychotropic Substances Act, 1985-a brief study of the act with special reference to its objectives, offences and punishment
9. Brief introduction to the study of the following acts:

Latest drugs (price control) order in force

Poisons Act 1919 (as amended to date)

Medicinal and toilet preparations (excise duties) Act, 1955 (as amended to date).

Medical termination of pregnancy act, 1971 (as amended to date).

REFERENCE BOOKS (LATEST EDITION)

1. Bare Acts of the said laws published by Government.

Course outcome:

Upon completion of this course the student should be able to understand the following points-

- Understand the basic knowledge about the laws and at related to the medicine.
- Students is able to understand the legal ways of marketing the drugs in India
- Students are made to understand the Patent act and the ways to protect their intellectual property rights. Student performing any research is able to get his/her invention patented.
- Students are made professionals in any act, rules and regulations regarding the import, export, marketing and the sales of drugs in India.

DPH205	D.Pharm (Part-II) Drug Store and Business Management	75 Hrs

LTPC
3003

SUBJECT: DRUG STORE AND BUSINESS MANAGEMENTS SUBJECT CODE: DPH205

Objectives: This subject is intended to impart the fundamental knowledge on various aspects of manufacturing, development, marketing and distribution of drug products including quality assurance of these activities. Major objective of this subject is to manage the –

- The Right quality
- Right quantity of supplies
- At the Right time
- At the Right place
- For the Right cost

PART-I COMMERCE (50 hours)

7. Introduction—trade, industry and commerce, functions and subdivision of commerce, introduction to elements of economics and management.
8. Forms of business organizations.
9. Channels of distribution.
10. Drug house management—selection of site, space lay out and legal requirements. Importance and objectives of purchasing, selection of suppliers, credit information, tenders, contracts and price determination and legal requirements thereto. Codification, handling of drug stores and other hospital supplies.
11. 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.
12. Sales promotion, market research, salesmanship, qualities of a salesman, advertising and window display.
13. Recruitment, training, evaluation and compensation of the pharmacist.
14. Banking and finance-service and functions of bank, finance planning and sources of finance.

PART-II ACCOUNTANCY (25 hours)

10. Introduction to the accounting concepts and conventions. Double entry book keeping, different kinds of accounts.
11. Cash book.
12. General ledger and trial balance.

13. Profit and loss account and balance sheet.
14. Simple techniques of analyzing financial statements. Introduction to budgeting.

REFERENCE BOOKS (LATEST EDITION)

1. Remington's Pharmaceutical Sciences.

Course outcome:

Upon completion of this course the student should be able to

- Management of store and Inventory- This involves physical control of materials, preservation of stores, efficient handling, maintenance of stores records, proper location and stocking etc.
- Management of stocked for sale or process of manufacturing.
- Management of materials, which are yet to be utilized.
- Appreciate the resource of an enterprise.

Course Structure: Diploma in Pharmacy

DPH206	**D.Pharm (Part-II)** **Hospital and Clinical Pharmacy**	**75 Hrs**

LTPC
3003

SUBJECT: HOSPITAL & CLINICAL PHARMACY SUBJECT CODE: DPH206

Objective: 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 counseling for improved patient care in the community set up.

PART-I HOSPITAL PHARMACY:

1. Hospital—definition, function, classification based on various criteria, organization, management and health delivery system in India.
2. Hospital pharmacy:
   (a) Definition
   (b) Functions and objectives of hospital pharmaceutical services.
   (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-patient services—(a) types of services (b) detailed discussion of unit dose system, floor ward stock system, satellite pharmacy services, central sterile services, bed side pharmacy.

4. Manufacturing:

(a) Economical considerations, estimation of demand.

(b) Sterile manufacture—large and small volume parenteral, facilities, requirements, layout, production planning, 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 surgical instruments and hospital equipments and health accessories.

6. P.T.C. (Pharmacy Therapeutic Committee), hospital formulary system and their organization, functioning, composition.

7. Drug information service and drug information bulletin.

8. Surgical dressing like cotton, gauze, bandages and adhesive tapes including their pharmacopoeial tests for quality. Other hospital supply eg. I.V. sets, B.G. sets, Ryals tubes, catheters, syringes etc.

9. Application of computers in maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital retail pharmacy establishment.

PART II CLINICAL PHARMACY:

1. Introduction to clinical pharmacy practice definition, scope.
2. Modern dispensing aspects—pharmacists and patient counseling and advice for the use of common drugs, medication history.
3. Common daily terminology used in the practice of medicine.
4. Disease, manifestation and pathophysiology including salient symptoms to understand the disease like tuberculosis, hepatitis, rheumatoid arthritis, cardiovascular 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 analgesics, diuretics, cardiovascular drugs, gastro intestinal agents, vitamins and hypoglycemic agents.
   (d) Drug-food interaction.
7. Adverse drug reactions.
   (a) Definition and significance.
   (b) Drug-induced diseases and teratogenicity.
8. Drugs in clinical toxicity—introduction, general treatment of poisoning, systemic antidotes, treatment of insecticide poisoning, heavy metal poison, narcotic drugs, barbiturate, organophosphorus poisons.
9. Drug dependences, drug abuse, addictive drugs and their treatment, complications.
10. Bioavailability of drugs, including factors affecting it.

REFERENCE BOOKS (LATEST EDITION)

1. Remington's Pharmaceutical Sciences
2. Martindale's Extra pharmacopoeia

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DPH256	**D.Pharm (Part-II)** **Hospital and Clinical Pharmacy**	**75 Hrs**

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1. Preparation of transfusion fluids.
2. Testing of raw materials used in
3. Evaluation of surgical dressings.
4. Sterilization of surgical instruments, glassware and other hospital supplies.
5. Handling and use of data processing equipments.

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

1. To know various drug distribution methods in a hospital
2. To appreciate the pharmacy stores management and inventory control
3. To monitor drug therapy of patient through medication chart review.
4. To identify drug related problems & detect and assess adverse drug reactions
5. To know pharmaceutical care services & do patient counseling in community pharmacy;
6. To appreciate the concept of Rational drug therapy.