

## **SEMESTER V**

**BP501T. MEDICINAL CHEMISTRY – II (Theory)**

**45 Hours**

**Course Content:**

**Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (\*).**

**Unit-I**

**10 Hours**

**Antihistaminic agents:** Histamine, receptors and their distribution in the human body.

**H<sub>1</sub>-antagonist:** Diphenhydramine hydrochloride\*, Dimenhydrinate, Doxylamine succinate, Clemastine fumarate, Diphenylpyraline hydrochloride, Triphelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate, Triprolidine hydrochloride\*, Phenidamine tartrate, Promethazine hydrochloride\*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetirizine Cromolyn sodium.

**H<sub>2</sub>-antagonists:** Cimetidine\*, Famotidine, Ranitidine.

**Gastric proton-pump inhibitors:** Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole.

**Anti-neoplastic agents:**

**Alkylating agents:** Meclorothamine\*, Cyclophosphamide, Melphalan, Chlorambucil, Busulfan, Thiotepea.

**Antimetabolites:** Mercaptopurine\*, Thioguanine, Fluorouracil, Floxuridine, Cytarabine, Methotrexate\*, Azathioprine.

**Antibiotics:** Dactinomycin, Daunorubicin, Doxorubicin, Bleomycin.

**Plant products:** Etoposide, Vinblastine sulphate, Vincristine sulphate.

**Miscellaneous:** Cisplatin, Mitotane.

**Unit-II**

**10 Hours**

**Anti-anginal:** Vasodilators: Amyl Nitrite, Nitroglycerin\*, Pentaerythritol tetranitrate, Isosorbide dinitrite\*, Dipyridamole.

Calcium channel blockers: Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.

**Diuretics:** Carbonic Anhydrase Inhibitors: Acetazolamide\*, Methazolamide, Dichlorphenamide.

Thiazides: Chlorthiazide\*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide,

Loop Diuretics: Furosemide\*, Bumetanide, Ethacrynic acid.

Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride. Osmotic Diuretics: Mannitol.

**Anti-hypertensive Agents:** Timolol, Captopril, Lisinopril, Enalapril, Benazepril

hydrochloride, Quinapril Hydrochloride, Methyldopate Hydrochloride\* Clonidine hydrochloride, Guanethidine Monosulphate, Guanabenz Acetate, Sodium Nitroprusside, Diazoxide, Minoxidil, Reserpine, Hydralazine hydrochloride.

### **Unit-III**

**10 Hours**

**Anti-arrhythmic Drugs:** Quinidine Sulphate, Procainamide Hydrochloride, Disopyramide Phosphate\*, Phenytoin Sodium, Lidocaine Hydrochloride, Tocainide Hydrochloride, Mexiletine Hydrochloride, Lorcaïnide Hydrochloride, Amiodarone, Sotalol.

**Anti-hyperlipidemic agents:** Clofibrate, Lovastatin, Cholestyramine and Colestipol.

**Coagulant & Anticoagulants:** Menadione, Acetomenadione, Warfarin\*, Anisindione, Clopidogrel.

**Drugs used in Congestive Heart Failure:** Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan.

### **Unit-IV**

**08 Hours**

**Drugs acting on Endocrine system:** Nomenclature, Stereochemistry and metabolism of steroids.

**Sex hormones:** Testosterone, Andralone, Progesterones, Oestriol, Oestradiol, Oestrione, Diethyl Stilbestrol.

**Drugs for erectile dysfunction:** Sildenafil, Tadalafil.

**Oral contraceptives:** Mifepristone, Norgestrel, Levonorgestrel

**Corticosteroids:** Cortisone, Hydrocortisone, Prednisolone, Betamethasone, Dexamethasone.

**Thyroid and antithyroid drugs:** L-Thyroxine, L-Thyronine, Propylthiouracil, Methimazole.

### **Unit-V**

**07 Hours**

**Antidiabetic agents:** Insulin and its preparations.

**Sulfonylureas:** Tolbutamide\*, Chlorpropamide, Glipizide, Glimpiride.

**Biguanides:** Metformin.

**Thiazolidinediones:** Pioglitazone, Rosiglitazone, Meglitinides, Repaglinide, Nateglinide.

**Glucosidase inhibitors:** Acarbose, Voglibose.

**Local Anesthetics:** SAR of Local anesthetics.

**Benzoic acid derivatives;** Cocaine, Hexylcaine, Meprylcaine, Cyclomethycaine, Piperocaine.

**Amino Benzoic acid derivatives:** Benzocaine\*, Butamben, Procaine\*, Butacaine, Propoxycaine, Tetracaine, Benoxinate.

**Lidocaine/Anilide derivatives:** Lignocaine, Mepivacaine, Prilocaine, Etidocaine.

**Miscellaneous:** Phenacaine, Dipiperodon, Dibucaine.

### **Recommended Books (Latest Editions)**

- Wilson and Gisvold's Organic Medicinal and Pharmaceutical Chemistry by Block J.H. and Beale J.M., Lippincott Williams and Wilkins, NY.
- Foye's Principles of Medicinal Chemistry by Lemke T.L., Williams D.A., Roche V.F. and Zito S.W., Lippincott Williams and Wilkins.
- Burger's Medicinal Chemistry and Drug Discovery by Abraham D.J., Volume I to IV, John Wiley and Sons Inc., New York.
- Synthesis of Essential Drugs by Vardanyan R.S. and Hruby V.J., Elsevier.
- Introduction to Medicinal Chemistry by Alex Gringauz, Wiley VCH.
- An Introduction to Medicinal Chemistry by Patrick Graham L., Oxford University Press.
- Medicinal Chemistry: A Biochemical Approach by Nogrady T., Oxford University Press, New York.
- The Organic Chemistry of Drug Design and Drug Action by Silverman R.B., Elsevier.
- Introduction to Principles of Drug Design by Smith and Williams, CRC Press, US.
- Medicinal and Pharmaceutical Chemistry by Singh H. and Kapoor V.K., Vallabh Prakashan, Delhi.
- Textbook of Drug Design and Discovery by Larsen P.K., Liljefors T. and Madsen U., Taylor and Francis Inc.
- Martindale's Extra Pharmacopoeia.
- Organic Chemistry by I.L. Finar, Vol. II, Dorling Kindersley (India) Pvt. Ltd., Delhi.
- The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1 to 5.
- The Pharmacopoeia of India, the Controller of Publications, Delhi.
- Elementary Practical Organic Chemistry by Vogel A.I., Dorling Kindersley (India) Pvt. Ltd. (Pearson Education Ltd.), New Delhi.

## BP502T. INDUSTRIAL PHARMACY I (Theory)

45 Hours

### Course content:

#### Unit-I

07 Hours

**Pre-formulation Studies:** Introduction to pre-formulation, goals and objectives, study of physicochemical characteristics of drug substances.

**Physical properties:** Physical form (crystal & amorphous), particle size, shape, flow properties, solubility profile (pKa, pH, partition coefficient), polymorphism.

**Chemical Properties:** Hydrolysis, oxidation, reduction, racemization, polymerization. BCS classification of drugs & its significance.

Application of pre-formulation considerations in the development of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.

#### Unit-II

10 Hours

##### Tablets:

Introduction, ideal characteristics of tablets, classification of tablets. Excipients, Formulation of tablets, granulation methods, compression and processing problems. Equipment's and tablet tooling.

Tablet coating: Types of coating, coating materials, formulation of coating composition, methods of coating, equipment employed and defects in coating. Quality control tests: In process and finished product tests.

##### Liquid orals:

Formulation and manufacturing consideration of syrups and elixirs suspensions and emulsions; Filling and packaging; evaluation of liquid orals official in Pharmacopoeia.

#### Unit-III

08 Hours

##### Capsules:

**Hard gelatin capsules:** Introduction, Production of hard gelatin capsule shells. Size of capsules, Filling, finishing and special techniques of formulation of hard gelatin capsules, manufacturing defects. In process and final product quality control tests for capsules.

**Soft gelatin capsules:** Nature of shell and capsule content, size of capsules, importance of base adsorption and minim/gram factors, production, in process and final product quality control tests. Packing, storage and stability testing of soft gelatin capsules and their applications.

**Pellets:** Introduction, formulation requirements, palletization process, and equipment for manufacture of pellets.

**Unit-IV****10 Hours****Parenteral Products:**

Definition, types, advantages and limitations. Preformulation factors and essential requirements, vehicles, additives, importance of isotonicity.

Production procedure, production facilities and controls, aseptic processing.

Formulation of injections, sterile powders, large volume parenteral and lyophilized products.

Containers and closures selection, filling and sealing of ampoules, vials and infusion fluids. Quality control tests of parenteral products.

**Ophthalmic Preparations:** Introduction, formulation considerations; formulation of eye drops, eye ointments and eye lotions, methods of preparation, labeling, containers, evaluation of ophthalmic preparations.

**Unit-V****10 Hours**

**Cosmetics:** Formulation and preparation of the following cosmetic preparations: lipsticks, shampoos, cold cream and vanishing cream, tooth pastes, hair dyes and sunscreens.

**Pharmaceutical Aerosols:** Definition, propellants, containers, valves, types of aerosol systems, formulation and manufacture of aerosols, Evaluation of aerosols, Quality control and stability studies.

**Packaging Materials Science:** Materials used for packaging of pharmaceutical products, factors influencing choice of containers, legal and official requirements for containers, stability aspects of packaging materials, quality control tests.

## BP506P. INDUSTRIAL PHARMACY I (Practical)

4 Hours/week

1. Preformulation studies of Paracetamol/Aspirin/or any other drug.
2. Preparation and evaluation of Paracetamol tablets.
3. Preparation and evaluation of Aspirin tablets.
4. Coating of tablets- film coating of tables/granules.
5. Preparation and evaluation of Tetracycline capsules.
6. Preparation of Calcium Gluconate injection.
7. Preparation of Ascorbic Acid injection.
8. Quality control test of (as per IP) marketed tablets and capsules.
9. Preparation of Eye drops/ and Eye ointments.
10. Preparation of Creams (cold / vanishing cream).
11. Evaluation of glass containers (as per IP).

### Recommended Books: (Latest Editions)

- Modern Pharmaceutics by Gilbert S. Banker; Christopher T. Rhodes, 4<sup>th</sup> edition; (Volume-121), Marcel Dekker, Inc., NY.
- Pharmaceutical Dosage Forms by Lieberman H.A., Lachman C., Parenteral Medications, Volume 1-3, Marcel Dekker Inc., USA.
- Pharmaceutical Dosage Forms by Lieberman H.A, Lachman C., Tablets, Volume 1-3, Marcel Dekker Inc., USA.
- Pharmaceutical Dosage Forms by Lieberman H.A, Lachman C., Disperse System, Volume 1-3, Marcel Dekker Inc., USA.
- The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS) by Remington.
- Lachman/Lieberman's Theory and Practice of Industrial Pharmacy by Roop K. Khar, S.P. Vyas, F.J. Ahmad and G.K. Jain, CBS Publishers & Distributers Pvt. Ltd., New Delhi.
- Pharmaceutics-The Science of Dosage form Design by M.E. Aulton, Churchill Livingstone, Latest edition.
- Introduction to Pharmaceutical Dosage Forms by H.C. Ansel, Lea & Febiger, Philadelphia, 5<sup>th</sup> edition, 2005.
- Drug stability- Principles and Practice by Cartensen & C.J. Rhodes, 3<sup>rd</sup> Edition, Marcel Dekker Series.
- Bentley and Driver's Textbook of Pharmaceutical Chemistry, Oxford University Press, New Delhi.
- J. Swarbrick, J.C. Boylar, 2<sup>nd</sup> ed., Encyclopedia of Practical Technology, Vol. 1-3, 2004. (Updated supplement).

**BP503T. PHARMACOLOGY-II (Theory)****45 Hours****Course Content:****Unit-I****10 Hours****Pharmacology of drugs acting on cardio-vascular system**

Introduction to hemodynamic and electrophysiology of heart Drugs used in congestive heart failure.

Anti-hypertensive drugs.

Anti-anginal drugs.

Anti-arrhythmic drugs.

Anti-hyperlipidemic drugs.

**Unit-II****10 Hours****Pharmacology of drugs acting on cardio vascular system**

Drug used in the therapy of shock.

Hematinics, coagulants and anticoagulants.

Fibrinolytics and anti-platelet drugs.

Plasma volume expanders.

**Pharmacology of drugs acting on urinary system**

Diuretics.

Anti-diuretics.

**Unit-III****10 Hours****Autacoids and related drugs**

Introduction to autacoids and classification of Histamine, 5-HT and their antagonists.

Prostaglandins, Thromboxanes and Leukotrienes.

Angiotensin, Bradykinin and Substance P.

Non-steroidal anti-inflammatory agents.

Antigout drugs, Anti rheumatic drugs.

**Unit-IV****08 Hours****Pharmacology of drugs acting on endocrine system**

Basic concepts in endocrine pharmacology.

Anterior Pituitary hormones- analogues and their inhibitors.

Thyroid hormones- analogues and their inhibitors.

Hormones regulating plasma calcium level- Parathormone, Calcitonin and Vitamin D.

Insulin, Oral Hypoglycemic agents and glucagon. ACTH and corticosteroids.

**Unit-V****07 Hours****Pharmacology of drugs acting on endocrine system**

Androgens and Anabolic steroids. Estrogens, progesterone and oral contraceptives. Drugs acting on the uterus.

**Bioassay**

Principles and applications of bioassay. Types of bioassay.

Bioassay of insulin, oxytocin, vasopressin, ACTH, d-tubocurarine, digitalis, histamine and 5-HT.



## BP507P. PHARMACOLOGY-II (Practical)

4Hours/Week

1. Introduction to *in-vitro* pharmacology and physiological salt solutions.
2. Effect of drugs on isolated frog heart.
3. Effect of drugs on blood pressure and heart rate of dog.
4. Study of diuretic activity of drugs using rats/mice.
5. DRC of acetylcholine using frog *rectus abdominis* muscle.
6. Effect of physostigmine and atropine on DRC of acetylcholine using frog *rectus abdominis* muscle and rat ileum respectively.
7. Bioassay of histamine using guinea pig ileum by matching method.
8. Bioassay of oxytocin using rat uterine horn by interpolation method.
9. Bioassay of serotonin using rat fundus strip by three-point bioassay.
10. Bioassay of acetylcholine using rat ileum/colon by four-point bioassay.
11. Determination of PA<sub>2</sub> value of prazosin using rat anococcygeus muscle (by Schild plot method).
12. Determination of PD<sub>2</sub> value using guinea pig ileum.
13. Effect of spasmogens and spasmolytic using rabbit jejunum.
14. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.
15. Analgesic activity of drug using central and peripheral methods

*Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by software and videos*

### Recommended Books (Latest Editions)

- Rang and Dale's Pharmacology by Rang H. P., Dale M. M., Ritter J. M., Flower R. J. Churchill Livingstone Elsevier.
- Basic and Clinical Pharmacology by Katzung B. G., Masters S. B., Trevor A. J., Tata McGraw-Hill.
- The Pharmacological Basis of Therapeutics by Goodman and Gilman's, McGraw Hill, USA.
- Applied Therapeutics: The Clinical use of Drugs by Marry Anne K. K., Lloyd Yee Y., Brian K.A., Robbin L.C., Joseph G. B., Wayne A.K., Bradley R.W., Lippincott Williams & Wilkins.
- Lippincott's Illustrated Reviews - Pharmacology by Mycek M.J, Gelnet S.B and Perper M.M.
- Essentials of Medical Pharmacology by K.D. Tripathi, Jaypee Brothers Medical Publishers, New Delhi.
- Principles of Pharmacology by Sharma H. L., Sharma K. K., Paras medical publisher.
- Modern Pharmacology with Clinical Applications by Charles R. Craig & Robert, Lippincott Williams & Wilkins, USA.
- Fundamentals of Experimental Pharmacology by Ghosh M.N., Hilton & Company.
- Handbook of Experimental Pharmacology by Kulkarni S.K., Vallabh Prakashan.

**BP504T. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Theory)**

**45Hours**

**Course Content:**

**Unit-I**

**7 Hours**

**Metabolic pathways in higher plants and their determination**

Brief study of basic metabolic pathways and formation of different secondary metabolites through these pathways- Shikimic acid pathway, Acetate pathways and Amino acid pathway. Study of utilization of radioactive isotopes in the investigation of Biogenetic studies.

**Unit-II**

**14 Hours**

General introduction, composition, chemistry & chemical classes, bio -sources, therapeutic uses and commercial applications of following secondary metabolites:

**Alkaloids:** Vinca, Rauwolfia, Belladonna, Opium.

**Phenylpropanoids and Flavonoids:** Lignans, Tea, Ruta.

**Steroids, Cardiac Glycosides & Triterpenoids:** Liquorice, Dioscorea, Digitalis.

**Volatile oils:** Mentha, Clove, Cinnamon, Fennel, Coriander.

**Tannins:** Catechu, Pterocarpus.

**Resins:** Benzoin, Guggul, Ginger, Asafoetida, Myrrh, Colophony.

**Glycosides:** Senna, Aloes, Bitter Almond.

**Iridoids, Other terpenoids & Naphthaquinones:** Gentian, Artemisia, Taxus, carotenoids.

**Unit-III**

**06 Hours**

Isolation, Identification and Analysis of Phytoconstituents.

Terpenoids: Menthol, Citral, Artemisin.

Glycosides: Glycyrrhetic acid & Rutin.

Alkaloids: Atropine, Quinine, Reserpine, Caffeine

Resins: Podophyllotoxin, Curcumin.

**Unit-IV**

**10 Hours**

Industrial production, estimation and utilization of the following phytoconstituents:

Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin,

Caffeine, Taxol, Vincristine and Vinblastine.

**Unit-V**

**8 Hours**

**Basics of Phytochemistry**

Modern methods of extraction, application of latest techniques like Spectroscopy, Chromatography and electrophoresis in the isolation, purification and identification of crude drugs.

## **BP508P. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Practical)**

**4 Hours/Week**

1. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander.
2. Exercise involving isolation & detection of active principles:
  - a. Caffeine - from tea dust.
  - b. Diosgenin from Dioscorea.
  - c. Atropine from Belladonna.
  - d. Sennosides from Senna.
3. Separation of sugars by Paper chromatography.
4. TLC of herbal extract.
5. Distillation of volatile oils and detection of phytoconstituents by TLC.
6. Analysis of crude drugs by chemical tests:
  - (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh.

### **Recommended Books: (Latest Editions)**

- Trease and Evans Pharmacognosy by W.C. Evans, 16th edition, W.B. Saunders & Co., London.
- Pharmacognosy and Phytochemistry by Mohammad Ali, CBS Publishers and Distribution.
- Textbook of Pharmacognosy by C.K. Kokate, Purohit, Gokhale (2007), 37th Edition, Nirali Prakashan, New Delhi.
- Herbal Drug Industry by R.D. Choudhary, 1<sup>st</sup> Ed, Eastern Publisher, New Delhi.
- Essentials of Pharmacognosy by Dr. S.H. Ansari, 2<sup>nd</sup> Ed, Birla publications, New Delhi.
- Herbal Cosmetics by H. Panda, Asia Pacific Business Press, Inc., New Delhi.
- Textbook of Industrial Pharmacognosy by A.N. Kalia, CBS Publishers, New Delhi.
- Plant Cell Biotechnology by R. Endress, Springer-Verlag, Berlin, 1994.
- Pharmacognosy & Pharmacobiotechnology by James Bobbers, Marilyn KS, VE Tylor.
- The Formulation and Preparation of Cosmetic, Fragrances and Flavors by Louis Appell, Micelle Press.
- The Science and Practice of Pharmacy, 20<sup>th</sup> edition Pharmaceutical Science (RPS) by Remington.
- Textbook of Biotechnology by Vyas and Dixit, CBS Publishers & Distributers Pvt. Ltd., New Delhi.
- Biosynthesis of Natural Products by Manitto P., Ellis Horwood Limited.

## **BP505T. PHARMACEUTICAL JURISPRUDENCE (Theory)**

**45 Hours**

### **Course Content:**

#### **Unit-I**

**10 Hours**

##### **Drugs and Cosmetics Act, 1940 and its rules 1945:**

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

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

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

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

#### **Unit-II**

**10 Hours**

##### **Drugs and Cosmetics Act, 1940 and its rules 1945**

Detailed study of Schedule G, H, M, N, P, T, U, V, X, Y, Part XII B, Sch F & DMR (OA)  
Sale of Drugs – Wholesale, Retail sale and restricted license. Offences and penalties.

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

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

#### **Unit-III**

**10 Hours**

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

**Medicinal and Toilet Preparation Act-1955:** Objectives, Definitions, Licensing, Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties.

**Narcotic Drugs and Psychotropic substances Act-1985 and Rules:** Objectives, Definitions, Authorities and Officers, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, Offences and Penalties.

**Unit-IV****08 Hours**

**Study of Salient Features of Drugs and Magic Remedies Act and its rules:** Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties.

**Prevention of Cruelty to animals Act-1960:** Objectives, Definitions, Institutional Animal Ethics Committee, CPCSE guidelines for Breeding and Stocking of Animals, Performance of Experiments, Transfer and acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties.

**National Pharmaceutical Pricing Authority:** Drugs Price Control Order (DPCO)-2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM).

**Unit-V****07 Hours**

**Pharmaceutical Legislations** - A brief review, Introduction, Study of drugs enquiry committee, Health survey and development committee, Hathi committee and Mudaliar committee.

**Code of Pharmaceutical ethics** - Definition, Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath.

**Medical Termination of Pregnancy Act**

**Right to Information Act**

**Introduction to Intellectual Property Rights (IPR)**

**Recommended books: (Latest Edition)**

- Forensic Pharmacy by B. Suresh, Birla Publication Pvt. Ltd., Delhi.
- Textbook of Forensic Pharmacy by B.M. Mittal, Vallabh Prakashan, Delhi.
- Handbook of Drug Law by M.L. Mehra, the University Book Agency, Lucknow.
- A Textbook of Forensic Pharmacy by N.K. Jain, Vallabh Prakashan, Delhi.
- Drugs and Cosmetics Act/Rules, Govt. of India publications.
- Medicinal and Toilet Preparations Act 1955, Govt. of India Publications.
- Narcotic Drugs and Psychotropic Substances Act, Govt. of India Publications.
- Drugs and Magic Remedies Act, Govt. of India Publication.
- Bare Acts of the Laws.
- Intellectual Property Rights in Pharmaceutical Industry: Theory and Practice by B. Subba Rao and P.V. Appaji, PharmaMed Press, Hyderabad.

### **BP509P. HOSPITAL TRAINING-I**

Training of students at a hospital establishment for a minimum duration of 45 days. The hospital training shall include: First aid (wound dressing, artificial respiration etc.), different routes of injection, study of patient observation charts, prescriptions and dispensing, simple diagnostic reports, etc.

**May be performed at the end of the 4<sup>th</sup> semester.**