III/IV B.PHARMACY (5th Semester)

501 PHARMACEUTICAL CHEMISTRY-IV (MEDICINAL–II)

(Theory) (75 hrs.)

Unit : 01

Quantitative structure activity relationship (QSAR) studies, basic concepts of computer aided drug design, different drug design approaches, basic concepts of combinatorial synthesis.

Unit : 02

General Anaesthetics : Introduction, classification, mechanism of action, synthesis and therapeutic uses of halothane, ketamine, methohexital.

Local Anaesthetics : Introduction, chemical classification, ideal requirements, mode of action, SAR, structures of important local anaesthetics, metabolism and synthesis of benzocaine, procaine, lidocaine, tetracaine and cinchocaine.

Hypnotics and Sedatives – SAR of barbiturates, synthesis, metabolism and therapeutic uses of phenobarbital, amylobarbital, pentobarbital, cyclobarbitone calcium, thiopental, hexobarbital. chlordiazepoxide, diazepam, alprazolam.

Anti-psychotics – SAR of phenothiazines, synthesis and therapaeutic uses of promethazine, Prochlorperazine, Fluphenazine, chlorpromazine, haloperidol, clozapine, oxypentine.

Anti– depressants: Synthesis and therapaeutic uses of amitryptaline, doxepine, iproniazid, isocarboxizide, trazodone, fluoxetin

Anti – Anxietyagents : Synthesis and therapaeutic uses of nitrazepam, lorazepam, prazepam

Anti-epileptics – Synthesis and therapaeutic uses of phenytoin, valproic acid, carbamazepine, ethosuximide.

Unit : 03

Drugs affecting adrenergic mechanism : Adrenergic receptors, biosynthesis of catecholamines, chemical classification along with structures, S.A.R of adrenergic drugs, adrenergic agonists, adrenergic blockers. Synthesis and therapeutic uses of phenylephrine, ephedrine, naphazoline, terbutaline, dopamine, amphetamine, phenoxybenzamine, propranolol, metaprolol, atenolol, tolazoline.

Drugs affecting cholinergic mechanism: Introduction, SAR, cholinergic receptors, study of cholinergic agonists, indirectly acting cholinergic agonists, cholinergic blocking agents, neuromuscular blocking agents. Synthesis and therapeutic uses of methacholine, carbachol, neostigmine, pralidoxime, propantheline, dicyclamine, tropicamide, atropine, bipyridine.

Unit : 04

Cardiovascular Agents: Introduction, classification, mechanism of action of antianginal agentscalcium channel blockers, Anti-arrhythmic drugs, antihypertensive agents, antihyperlipidemic agents and anticoagulants. Synthesis and therapeutic uses of methyldopa, amlodipine, clonidine, hydralazine, verapamil, clofibrate, dicoumorol, warfarin

Hypoglycaemics : General account on pancreatic malfunctions. chemical classification, S.A.R of hypoglycemics, Insulin preparations, a brief account on statin antidiabetics – phenformin, glipizide, chlopropamide, including a brief account on PPARγ inhibitors, meglitinide analogues, α-glucosidase inhibitors–Acarbose, miglitol. A brief account on thyroid and antithyroid drugs.

Unit : 05

Opoid Analgesics : Classification along with structures, mechanism of action, S.A.R of opioid analgesics, mixed agonists and mixed antagonists, central and peripheral acting anti tussive agents. Structure and therapeutic uses of morphine, codeine, diacetylmorphine, nalorphine, levalophan, noscapine, dextromethorphan.

NSAIDS (Non-steroidal anti-inflamatory agents) : Introduction and types of pain and inflammation. Synthesis, metabolism and therapeutic uses of aspirin, paracetamol, ibuprofen, mefenamic acid, diclofenac, piroxicam. A brief account on Cox-2 inhibitors.

Unit : 06

DIURETICS : Introduction, chemical classification along with structures, mechanism of action, S.A.R, metabolism and synthesis of acetazolamide, benzthiazide, furosemide, ethacrynic acid chlorthiazide, hydrochlorthiazide and amiloride.

Antihistaminic agents : Introduction, histamine receptors, biosynthesis of histamine, study of H1 and H2 antagonists. Chemical classification along with structures, mechanism of action, S.A.R, of antihistamines. Synthesis and metabolism of diphenhydramine, pyrilamine, mepyramine, cyclizine pheninramine, promethazine, antazoline, astimizole, cetrizine, cimetidine.

Diagnostic agents : Introduction, structures and therapeutic uses of some important organic compounds as diagnostic agents. Synthesis of iopanoic acid, fluorescein, diatriazoic acid and metyrapone

III/IV B.PHARMACY (5th Semester)

502 PHARMACEUTICAL CHEMISTRY–IV
(MEDICINAL-II) (Practicals) (75 hrs.)

01*. Assay of indomethacin capsules – I.P.
02*. Assay of glipizide/frusemide tablets – I.P.
03*. Assay of ibuprofen suspension – I.P.
04*. Assay of paracetamol elixir/tablet – I.P.
05. Assay of ascorbic acid tablets – I.P.
06*. Assay of salicylic acid ointment – I.P.
07*. Assay of aminophylline injection - I.P.
08. Assay of metronidazole tablets – I.P.
09*. Synthesis of benzil from benzoin
10. Synthesis of benzillic acid from benzil
11. Synthesis of 7-hydroxy 4-methyl coumarin
12. Synthesis of benzimidazole
13*. Synthesis of benzocaine
14*. Synthesis of benzotriazole
15. Synthesis of aspirin
16*. Synthesis of phenytoin (5, 5' – diphenyl hydantoin)
17. Synthesis of sulphanilamide.

TEST BOOKS

1. Text book of Medicinal Chemistry by William O. Foye, Lea Febiger, Philadelphia. Wilson & Giswold's Text book of organic Medicinal Chemistry and pharmaceutical chemistry by JH Block & JM Beale (Eds), 11th Ed, Lipcott, Raven, Philadelphia, 2004.
2. D. Abraham (Ed), Burger Medicinal chemistry ad Drug discovery, Vol. 1 & 2. John Wiley & Sons, New York 2003, 6th Ed.
3. Lippincott Williams and Wilkins: Remington Pharmaceutical Sciences; 20th Edition.
4. Bentley and Driver's Textbook of Pharmaceutical Chemistry Ed: l. M. Atherden. Oxford University Press, Delhi.
5. B.N. Lads, MG.Mandel and F.I. way, Fundamentals of drug metabolism & disposition, William & welking co, Baltimore USA.
6. Hansch, Comprehensive medicinal chemistry, Vol 1 – 6 Elsevier pergmon press, Oxford
7. Rama Rao Nadendla, Principles of Organic Medicinal chemistry, Vol-I, New-Age International Publishers Pvt., limited, New Delhi, 2005
8. Daniel lednicer, Strategies For Organic Drug Synthesis And Design, John Wiley, N. Y. 1998.
9. D. Lednicer, Organic drug synthesis, Vol, 1 – 6, J.Wiley N.Y.

III/IV B.PHARMACY (5th Semester)

MODEL QUESTION PAPER

501 PHARMACEUTICAL CHEMISTRY-IV (MEDICINAL-II) (Theory)

Time : 3 hours Max.Marks : 70

SECTION-A

Answer any four questions (4 X 10 = 40 marks)

1. Add a note on different drug design approaches. Give a detailed account of computer aided drug design.
2. Classify sedatives and hypnotics with suitable examples. Write the SAR and mode of action of Barbiturates.
3. Outline the chemical classification of adrenergic drugs. Discuss their mode of action and SAR.
4. What are oral hypoglycemic agents ? Classify them with examples and write their mode of action.
5. Classify the non-steroidal anti inflammatory agents with examples and discuss their mode of action ? How do you synthesize diclofenac and piroxicom ?
6. Classify H1 antagonists with examples ? Discuss the SAR and mechanism of action of these drugs.

SECTION - B

Answer any TEN questions (10 X 3 = 30 marks)

7. Write short notes on Free Wilson analysis
8. Short notes on descriptors used in QSAR
9. Outline the synthesis and therapeutic uses of phenytoin.
10. Mechanism of action of MAO inhibitors.
11. Short notes on cholinergic receptors.
12. Give the synthesis and mechanism of propantheline.
13. Write short notes on antianginal agents.
14. Outline the synthesis of clonidine
15. Discuss the mode of action of opioid analgesics
16. Short notes on opioid antagonists
17. Write the SAR and mode of action of thiazide diuretics.
18. Add a note on synthesis and metabolism of cetrizine.

III/IV B.PHARMACY (5th Semester)

MODEL QUESTION PAPER (Practicals)

502 PHARMACEUTICAL CHEMISTRY-IV (MEDICINAL-II)

Time : 4 hours Max.Marks : 70

1.	Synopsis	:	10 Marks
2*.	Major Experiment	:	30 Marks
3.	Minor Experiment	:	20 Marks
4.	Viva-Voce	:	10 Marks

	Total	:	70 Marks

III/IV B.PHARMACY (5th Semester)

503 PHARMACEUTICS-II

(DOSAGE FORM TECHNOLOGY INCLUDING COSMETICS)

(Theory) (75 hrs.)

UNIT : 01

Formulation : Physical chemical and therapeutic factors in-volved in the formulation of dosage forms. Introduction to pre-formulation studies. Formulation additives in solid, semi-solid
and parenteral dosage forms.

UNIT : 02

A study of the principles, formulation, manufacturing process and equipment and quality control of the following dosage forms.

Liquid orals - Manufacture and quality control of solutions, emulsions and suspensions.

Semi-solids : Ointments, creams, pastes, Jellies - Definitions, Ideal requirements, Types of bases, selection of base, Typical examples.

UNIT : 03

A study of the principles, formulation, manufacturing process and equipment and quality control of the following dosage forms.

Solids: Compressed tablets Types - Formulation additives, Formulation, manufacture and quality control of tablets -Examples (I.P.) Processing prob-lems.

Capsules : Hard and soft: Formulation, manufacture and their quality control.

Tablet coating: Purpose - Sugar, film and enteric coating meth-ods.

UNIT : 04

Parenterals : Definitions, Types, Formulation aspects, produc-tion facilities, lay out, manufacturing and quality control, Typi-cal examples from I.P.

Ophtalmic preparations : Eye ointments, Eye drops, Ideal require-ments, Formulation, manufacture and quality control, Typical examples from I.P.

UNIT : 05

Pharmaceutical Aerosols: Definitions, classification - formula-tion, propellents, pressurized packagings, applications

Radiopharmaceuticals: Therapeutic and diagnostic uses. Pro-duction of radio Pharmaceuticals - Care in handling.

UNIT : 06

Cosmetics: A Study of formulation manufacture and evaluation of cleaning creams, nail lacquers and nail polish removers, deodorants and antiperspirants, shampoos, hair bleaches and depilatories, shaving creams.

504 PHARMACEUTICS – II

(DOSAGE FORM TECHNOLOGY INCLUDING COSMETICS)

(Practicals) (75 hrs.)

01*. Formulation of an anti-pyretic liquid oral for a child below ten years.
02. Formulation of paediatric liquid oral of ibuprofen
03. Formulation of paediatric liquid oral of amoxycillin
04. Formulation of an antacid liquid oral
05*. Manufacture of dummy lactose tablets
06. Quality control tests of dummy lactose tablets
07*. Manufacture of calcium phosphate tablets
08. Manufacture of chewable antacid tablets
09*. Manufacture of ibuprofen-tablets by direct compression.
10. Manufacture of aqueous cream base
11*. Formulation of piroxicam capsules.
12. Quality control tests for capsules.
13. Manufacture of sodium alginate jelly
14. Manufacture of piroxicam jelly
15. Manufacture of sodium CMC lubricating jelly
16. Manufacture of dextrose ampoules by terminal sterilization.
17. Manufacture of $NaNO_3$ ampoules by terminal sterilization.
18. Disintegration test for different types of tablets.
19*. Dissolution test for tablets.
20. Formulation and evaluation of antidandruff shampoo.

TEXT BOOKS :

01. Theory and Practice of Inustrial Pharmacy by Lachman
02. Bentley's Text Book of Pharmaceutics
03. Remington's Pharmaceutical Sciences
04. Pharmaceutical Dosage Forms – Tablets by H.A.Liberman
05. Modern pharmaceutics by Banker
06. Pharmaceutics by Aulton
07. Encyclopedia of Pharmaceutical technology by Swarbrick
08. Cosmetic science and technology by Sagarin
09 Cosmetics - Manufacture, Formulation and Quality control - P.K.Sharma.

III/IV B.PHARMACY (5th Semester)

MODEL QUESTION PAPER

503 PHARMACEUTICS-II (Theory)

(DOSAGE FORM TECHNOLOGY INCLUDING COSMETICS)

Time : 3 hours Max. Marks : 70

SECTION - A

Answer any four questions (4 X 10 = 40 Marks)

1. Discuss the physico-chemical factors involved in the preformulation of solid dosage forms.
2. What are the ideal requirements of ointment bases ? Classify ointment bases with examples.
3. What are different methods used in manufacture of tablets ? Explain about wet granulation process.
4. Describe the facilities for commercial production of parenterals with neat layout
5. What are the advantages of aerosols. With a neat sketch. Explain the metering valve for pharmaceutical aerosols.
6. Classify shampoos. Write down the ideal requirements of shampoos.

SECTION - B

Answer any TEN questions (10 X 3 = 30 Marks)

7. Write a note on additives used in tablet dosage forms.
8. Explain the significance of the preformulation studies.
9. Write a note on controlled flocculation.
10. Explain the evaluation tests for emulsions.
11. Explain about sugar coating.
12. Explain about Softgels
13. Write a note on opthalmic preservatives.
14. Write any 2 evaluation tests for parenterals.
15. Explain about handling of Radio pharmaceuticals.
16. Write a note on evaluation tests for aerosols.
17. Write a short notes on depilatories.
18. Write a short notes on formulation of nail polish removers.

III/IV B.PHARMACY (5th Semester)

MODEL QUESTION PAPER (Practicals)

504 PHARMACEUTICS-II

(DOSAGE FORM TECHNOLOGY INCLUDING COSMETICS)

Time : 6 hours Max.Marks : 70

1.	Synopsis	:	10 Marks
2*.	Major Experiment	:	30 Marks
3.	Minor Experiment	:	20 Marks
4.	Viva-Voce	:	10 Marks

	Total	:	70 Marks

III/IV B.PHARMACY (5th Semester)

505 PHARMACOGNOSY - I (Theory) (75 hrs.)

Unit : 01

Definitions, history, scope and development of pharmacognosy. Sources of natural drugs, organized and unorganized drugs. Different methods of classification of crude drugs.

Unit : 02

Cultivation, collection, processing and storage of crude drugs. Factors influencing cultivation of medicinal plants. Types of soils and fertilizers of common use. Pest management and natural pest control agents. Plant hormones and their application. Polyploidy, mutation and hybridization with reference to medicinal plants.

Unit : 03

Quality control of crude drugs : Adulteration of crude drugs and their detection by organoleptic, microscopic, physical, chemical and biological methods of evaluation.

Unit : 04

Systematic pharmacognostic study (microscopical characters, varieties, adulterants, substituents, principle constituents and uses) of the following

1. **Carbohydrates and derived products :** Agar, guar gum, gum acacia, honey, isabgol, pectin, starch, sterculia and tragacanth
2. **Proteins and enzymes:** Gelatin, papain, yeast.
3. **Tannins:** Arjuna, black catechu, gambier catechu.

Unit : 05

Study of fibres used in pharmacy such as asbestos, cotton, glass- wool, nylon, polyster, silk and wool.

Resin and Resin combinations : Asafoetida, balsam of peru, balsam of tolu, benzoin, cannabis, capsicum, ginger, guggel, jalap, myrrh, podophyllum, storax, turmeric.

Unit : 06

An introduction to biogenesis of primary and secondary metabolities of pharmaceutical importance

III/IV B.PHARMACY (5th Semester)

506 PHARMACOGNOSY – I (Practicals) (75 hrs.)

01. Identification of Carbohydrates (Agar, Acacia, Starch, Honey, Tragacanth, Guargum, Pectin, Isabgol), Tannins (Black catechu), Resins (Benzoin, Asafoetida, storax, myrrh), Fibres (absorbent cotton, non-absorbent cotton, silk and wool) by general and specific chemical tests.

02. **Cellular Structures :**
    - i. Measurement of length and width of phloem fibres in powdered crude drugs, (Cinchona & Cinnamon)
    - ii. Measurement of starch grains (Ginger and Potatostarch)
    - iii. Measurement of calcium oxalate crystals (squill)

03. Determination of Leaf constants
    - i*. Determination of stomatal number and stomatal index (Datura and Senna)
    - ii*. Determination of veinislet number
    - ii. Determination of swelling factor of the given seeds (Isabgol)
    - iv. Determination of ash value.
    - v*. Determination of Palisade ratio

04 **Identification of crude drug by organoleptic and morphological characters :** Fibres (Cotton, Wool, Silk), Carbohydrates (Agar, Isapgol, acacia, tragacanth, Honey) , Proteins & Enzymes (Yeast), Tannins (Black catechu, Arjuna), Resins (Benzoin, Myrrh, Asafoetida, Turmeric, Ginger, Jalap, Podophylum.)

05. Determination of extractive value of crude drug

06. Extraction of eucalyptus oil

TEXT BOOKS :

01. Text book of Pharmacognosy by T.E.Wallis.
02. Text book of Pharmacognosy by Trease and Evans
03. Text book of Pharmacognosy by C.K.Kokate
04. Cultivation of Medicinal and Aromatic crops by A A Farooqui and B.S.Sree ramu
05. Pharmacognosy and Phytochemistry by Dr.Vinod Rangari,
06 Pharmacognosy and phytochemistry by Ashutoshkar.
07. Essentials of Pharmacognosy by Dr.S.H.Ansari.
08. Pharmacognosy and phytochemistry by Brady & Talyr
09. Text book of Pharmacognosy by S.S.Handa and V.K.Kapoor.

III/IV B.PHARMACY *(5th Semester)*

MODEL QUESTION PAPER

505 PHARMACOGNOSY - I (Theory)

Time : 3 hours *Max. Marks : 70*

SECTION - A

Answer any FOUR questions *(4 X 10 = 40 Marks)*

1. *Define crude drug and write the differences between organized and unorganized crude drugs.*
2. *Write in detail about endogeneous factors affecting cultivation of medicinal and aromatic plants.*
3. *Enumerate the physical methods of crude drug evaluation.*
4. *Write the systematic pharmacognostic study of gum acacia.*
5. *Write the applications of pharmaceutical fibres.*
6. *Give an account of biosynthetic pathways for the formation of important alkaloids.*

SECTION - B

Answer any TEN questions *(10 X 3 = 30 Marks)*

7. *Write in brief about various sources of crude drugs.*
8. *Write the chemical classification of crude drugs.*
9. *Discuss the importance of sort and soil fertility in the cultivation of medicinal and aromatic plants.*
10. *Classify plant harmones and write the applications of gibberellins in cultivation technology.*
11. *Enumerate the methods of crude drug adulteration with examples.*
12. *What is micrometry and write its significance in the evaluation of crude drugs.*
13. *Define carbohydrates, write the biological source and uses of tragacanth*
14. *Write the chemical constituents and uses of gelatin and arjuna.*
15. *Differentiate wool and silk*
16. *Method of preparation of surgical cotton.*
17. *Explain the biosynthesis of indole alkaloids.*
18. *Write the biological source and chemical constituents of storax and asafoetida.*

III/IV B.PHARMACY *(5th Semester)*

MODEL QUESTION PAPER (Practicals)

506 PHARMACOGNOSY-I

Time : 6 hours *Max.Marks : 70*

1.	*Synopsis*	*:*	*10 Marks*
2.*	*Major Experiment*	*:*	*30 Marks*
3.	*Minor Experiment*	*:*	*20 Marks*
4.	*Viva-Voce*	*:*	*10 Marks*

	Total	*:*	*70 Marks*

III/IV B.PHARMACY (5th Semester)

507 PHARMACOLOGY - I (Theory) (75 hrs.)

Unit : 01

General Pharmacology and pharmacodynamics : Factors influencing the effect of drugs. The Dose –effect relationship, Introduction to LD_{50} and ED_{50}, therapeutic index. General mechanism of drug action, Structure activity relationship, drug receptors, drug toxicity and drug allergy.

Unit : 02

Pharmacology of drugs acting on autonomic nervous system: Parasympathomimetics, parasympatholytics, sympathomimetics, sympatholytics, neuromuscular blocking agents and ganglionic blockers.

Unit : 03

Pharmacology of drugs acting on central nervous system : Synaptic transmission in the CNS; General anaesthetics, hypno-sedatives, analgesics, antipyretics and anti-Inflammatory agents.

Unit : 04

Pharmacology of drugs acting on central Nervous system : Antiepileptics, antiparkinsonian drugs, psycho- pharmacological agents, CNS stimulants, hallucinogens and drugs used in gout

Unit : 05

Pharmacology of drugs acting on Gastro –intestinal system : Purgatives, Antidiarrhoeal drugs, treatment of peptic ulcer, emetics and anti- emetics.

Unit : 06

Pharmacology of local anaesthetics and diuretics.

TEXT BOOKS :

01. Goodman and Gilman - The Pharmacological Basis of Therapeutics.
02. Textbook of Pharmacology by Rang and Dale
03. Quientessence of Medical Pharmacology by C.Chowdary.
04. Lippincott's illustrated reviews - Pharmacology by Richard D.Howland and Mery J.Mylek.
05. Essentials of medical pharmacology by K.D.Tripathi.
06. Pharmacology and Pharmacotherapeutics by R.S.Satoskar, S.D.Bhanderkar and S.S.Ainapure.

III/IV B.PHARMACY (5th Semester)

MODEL QUESTION PAPER

507 PHARMACOLOGY-I (Theory)

Time : 3 hours Max.Marks : 70

SECTION - A

Answer any four questions (4 X 10 = 40 Marks)

1. Discuss the mechanisms of drug action with suitable examples.
2. Classify cholinesterase inhibitors with suitable examples and discuss about the management of organophosphorous poisoning.
3. Classify the anti inflammatory drugs with suitable examples and discuss the pharmacology of salicylates.
4. Classify antidepressants. How do tricyclic antidepresants act ? Write their clinical usefulness.
5. Classify and discuss the various drugs that are used in peptic ulcer. Add a note on proton-pump inhibitors.'
6. Classify diuretics with suitable examples and discuss the mechanism of action and adverse effects of furosemide ?

SECTION - B

Answer any TEN questions (10 X 3 = 30 Marks)

7. Describe briefly dose-effect relationship.
8. Explain antagonism with examples.
9. Write short notes on neuromuscular blocking drugs.
10. Discuss the mechanism of action and therapeutic uses of adrenaline.
11. Write notes on benzodiazepines.
12. Add a note on endogenous opioid peptides.
13. Write short notes on L-Dopa.
14. Describe the mechanism of action and mention the therapeutic uses and toxicities of phenytoin.
15. Add a note on emetics.
16. Write notes on pharmacology of allopurinol .
17. Describe the mechanism of action and therapeutic uses of cocaine.
18. Discuss different routes of administration of local anesthetics.