

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B. Pharm II-Sem

T	P	C
3+1*	0	3

(R9501) MEDICINAL CHEMISTRY – I

UNIT – I www.engineershub.in

Basic considerations of Drug activity : Physico chemical properties of drug molecules in relation to biological activity – Solubility, lipophilicity, partition-coefficient, Ionization, hydrogen bonding, Chelation, redox potential and surface activity. Bioisosterism and steric features of drugs, drug distribution and protein binding: Introduction to Pro and soft drug approach in drug design.

UNIT – II

Drug metabolism and inactivation : Introduction, Phase-I and Phase-II reactions.

Note: Introduction, definition, nomenclature, chemical classification, structure, synthesis, general mechanism, and mode of action. SAR including physicochemical and stereo chemical aspects, metabolism and therapeutic uses of the drugs from each category shall be studied for the following units. An outline of synthetic procedure of only the drugs mentioned in each category.

UNIT – III

Drugs acting on CNS : A brief study of the chemistry of neurotransmitters. Hypnotics and Anxiolytics – Phenobarbital, diazepam, alprazolam, glutethimide

Anti-psychotics – Chlorpromazine, haloperidol, clozapine, oxypentine.

Anti-epileptics – Phenytoin, valproic acid, carbamazepine, ethosuximide.

Anti-depressants – Imipramine, fluoxetine, doxepine.

UNIT - IV

Local anesthetic and General anesthetic agents : Benzocaine, procaine, dibucaine and lidocaine, halothane and thiopental sodium.

UNIT – V

Adrenergic agens and adrenergic blockers. Isoproterenol, atenolol, phenoxybenzamine, Amphetamine, ephedrine, salbutamol.

UNIT – VI**Cholinergic agents and acetyl cholinesterase inhibitors**

- Cholinergics - Carbachol, bethanichol
 Anticholinesterase - Neostigmine, pyridostigmine
 Neuromuscular blockers - succinyl choline.

UNIT – VII

Anti-cholinergics : Atropine, ipratropium bromide, dicyclomine, bipyridine, propantheline

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UNIT – VIII

Prostaglandins . Introduction, nomenclature, functions, bio synthesis of prostaglandin E1, Structures of clinically useful prostaglandins.

TEXT BOOKS :

1. William O. Foye, Textbook of Medicinal Chemistry, Lea Febiger, Philadelphia.
2. JH Block & JM Beale (Eds), Wilson & Giswold's Text book of organic Medicinal Chemistry and pharmaceutical chemistry, 11th Ed, Lippcott, Raven, Philadelphia, 2004.
3. Medicinal Chemistry by Korol Kavas.

REFERENCES

1. D. Abraham (Ed), Burger Medicinal chemistry ad Drug discovery, Vol. 1 & 2, John Wiley & Sons, New York 2003, 6th Ed.
2. Lippincott Williams and Wilkins, Remington Pharmaceutical Sciences; 20th Edition.
3. C. Hansch, Comprehensive medicinal chemistry, Vol 1 – 6 Elsevier pergmon press, Oxford
4. Daniel lednicer, Strategies for Organic Drug Synthesis and Design, John Wiley, N. Y. 1998.
5. D. Lednicer, Organic drug synthesis, Vol, 1 – 6, J.Wiley N.Y.
6. Kadam, Textbook of Medicinal Chemistry Vol. 1 & 2.
7. T Nogrady, Medicinal Chemistry – A Biochemical Approach, Oxford University Press, New York, Oxford.

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(R9502) PHARMACEUTICAL TECHNOLOGY - II

UNIT-I

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Tablets : Formulation of different types of tablets, granulation technology on large-scale by various techniques, types of tablet compression machinery and the equipments employed evaluation of tablets.

UNIT-II

Coating of Tablets : Types of coating, coating materials and their selection, formulation of coating solution, equipment for coating, coating processes and evaluation of coated tablets.

UNIT-III

Capsules: Advantage and disadvantages of capsule dosage forms, material for production of hard and soft gelatin capsules, sizes of capsules, capsule filling, processing problems in capsule manufacturing, importance of base absorption and minimum/gm factors in soft capsules, quality control, stability testing and storage of capsule dosage forms.

UNIT-IV

Microencapsulation: Types and importance in pharmacy, microcapsulation by coacervation phase separator, multi orifice centrifugal separation. Spray drying, spray congealing, polymerization complex emulsion, air suspension technique, and pan coating techniques and evaluation of microcapsules.

UNIT-V**Parenteral Products**

- a. Preformulation factors, routes of administration, water for injection, treatment apyrogenicity, non-aqueous vehicles, isotonicity and methods of its adjustment.
- b. Formulation details, container and closures and selection.
- c. Prefilling treatment, washing and sterilization of containers and closures, preparation of solution and suspensions, filling and closing of ampules, vials, infusion fluids, lyophilization & preparation of sterile powders, equipment for large-scale manufacture and evaluation of parenteral products.

UNIT-VI

Aseptic techniques, sources of contamination and method of prevention. Design of aseptic area, laminar flow benches, services and maintenance.

UNIT-VII

Packaging of Pharmaceutical products: Packaging components, types, specifications and methods of evaluation as per I.P. Factors influencing choice of containers, package testing, legal and other official requirements for containers, packing testing.

UNIT-VIII

Methods of packing of solid, liquid and semi-solid dosage forms, Factors influencing packing material and stability aspects of packaging.

TEXT BOOKS

1. L. Lachman, H.A. Lieberman and J.L. Kanig, Theory & Practice of industrial pharmacy, Lea & Febiger, Philadelphia Latest Edn
2. HC Ansel introduction to Pharmaceutical Dosage forms
3. Pharmaceutical Dosage forms Tablet by Lieberman, Lachman
4. CVS. Subramanyam, Pharmaceutical production and management, Vallabh Prakashan, New Delhi 2005.

REFERENCES

1. Sagarian & MS Balsam, Cosmetics Sciences & Technology, Vol. I, 2 & 3
2. Lippincott Williams and Wilkins, Remington Pharmaceutical Sciences
3. E.A. Rawlkins Bentley's Text Book of Pharmaceutics, Elbs publ
4. S.H. Willing, M.M. Tucherman and W.S. Hitchings IV, Good Manufacturing Practices for Pharmaceuticals: A Plan for Total Quality Control, 2nd ed, Marcel Dekker, Inc., New York 1998.
5. Gilbert S. Banker and Christopher T Rhodes, Modern Pharmaceutics, IVth ed, marcel dekker, usa, 2005.
6. Yiew chien, novel drug delivery systems, 2nd ed, marcel dekker 2003.
7. Robert. A. Nash, Pharmaceutical Process Validation, 3rd Ed Marcel Dekker, 2003.
8. Good Manufacturing Practices – Schedule M. Read With The Drugs And Cosmetic Rules 1945 M.E. Aulton, Pharmaceutics- The science of Dosage form Design 2nd ed.

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(R9503) PHARMACOLOGY – II

UNIT-I

Pharmacology of Cardiovascular System - Hypertension & congestive heart failure

- a. Digitalis and cardiac glycosides
- b. Antihypertensive drugs.
- c. Drugs used in shock.

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UNIT-II Pharmacology of Drugs used in coronary artery disease and lipid – lowering drugs.

UNIT-III Pharmacology of drugs used arrhythmias

UNIT-IV

Drugs acting on hematopoietic system and urinary system

- a. Anti-coagulants, Anti-platelets & Thrombolytics.
- b. Hematinics.
- c. Fluid and electrolyte balance
- d. Diuretics

UNIT-V

Drugs acting on Endocrine system

- a. Insulin, Oral hypoglycaemic agents
- b. Adrenal steroids
- c. Drugs used in diseases of thyroid

UNIT-VI**Autacoids**

- a. Histamine, 5 HT and their antagonists.
- b. Prostaglandins, thromboxanes and leukotrienes
- c. Pentagastrin, cholecystokinin, angiotensin, Bradykinin and substance P

UNIT-VII

Principles of bioassays. Errors in bioassays. Study of bioassay methods for the following drugs

- a. Digitalis,
- b. D – tubocurarine,
- c. Oxytocine,
- d. HCG

UNIT-VIII**Drugs Acting on the Respiratory System**

- Anti asthmatic drugs including bronchodilators.
- Anti tussives and expectorants.
- Respiratory stimulants.

TEXT BOOKS

- Rang & Dale, Textbook of Pharmacology.
- Sathoskar, Pharmacology and pharmaco therapeutics Vol. 1 & 2, Publ by Popular Prakashan, Mumbai.
- Bertram. G. Katzung, Basic and clinical pharmacology, 9th Edn, Mc Graw hill
- Tripathi, Textbook of Pharmacology, JAYPEE
- Leilani Grajeda, Understanding Pharmacology: A physiological Approach
- F.S.K Barar, Essentials of Pharamcotherapeutics.

REFERENCES

- J.G. Hardman and Lee E. Limbard, Good Mann & Gilmann: The Pharmacological basis of therapeutics, Mc Graw hill, Health Professions Dvn.
- H.P Rang, M. M. dale & J.M. Ritter, Pharmacology, Churchill Living stone, 4th Ed.
- J. Crossland, Lewis 's Pharmacology, Church living stone

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(R9504) CHEMISTRY OF NATURAL DRUGS (Phytochemistry)

UNIT - I

Alkaloids : Definition. General methods of extraction of alkaloids.

Opium alkaloids : Structural features of Morphine molecule – Peripheral groups. Modification of structure and effect on analgesic activity – SAR of morphine and morphine-like analgesics.

Tropane alkaloids : Structural elucidation of Atropine, Pharmacological actions and uses of tropane alkaloid.

Rauwolfia alkaloids : Structures and uses of Reserpine, Rescinnamine, Deserpidine, ajmaline. Hydrolysis of reserpine and rescinnamine. Mechanism of action of reserpine.

UNIT - II

Terpenoids : Volatile oils: Definition of terpenoids, Classification, isoprene, special isoprene and gem-dialkyl rules.

Citrals : Sources and structures, isomerism in citral, citral-a (Geranial), citral-b (Neral). Reduction of citral to citronellal, citronellol, geraniol and nerol. Oxidation of citral to geranic acid. Cyclodehydration of citral to p-cymene. Synthesis of Vitamin – A1 from citral.

UNIT - III

Carvone : Sources and structure. Conversion into Carvacrol. Reduction of Carvone with different reagents. Synthesis from Limonene/Dipentene and alfa – Terpeneol.

Menthol and menthone : Sources, structures and uses. Oxidation of menthol to menthone. Conversion of menthol into thymol.

Chemistry and structural elucidation of menthol.

Camphor: Source, properties, commercial method of preparation from a-pinene and uses. Oxidation to camphoric acid and camphoronic acids, conversion into p-cymene. Reduction of camphor to Borneol & isoborneol. Source, structures, uses of isoborneol. Oxidation of borneols to camphor.

UNIT - IV

Steroids : Introduction & Nomenclature of steroids, structures, stereochemistry and numbering of ring system in cholesterol, ergosterol and stigmasterol.

Bile acids : Names, structures and functions.

UNIT - V

Hormones: Sex Hormones : Male and female sex hormones.

Estrogens – estradiol, estrone, estriol. Structures and their interconversion.

Structures of synthetic estrogens. Therapeutic uses and side effects.

Progesterone and selected progestins – structures, uses and side-effects.

Preparation of progesterone from diosgenin. A note on Steroid contraceptive agents and regimens. Androgens – Testosterone and derivatives. Structure and biological activities & uses.

UNIT - VI

Adrenal Cortex Hormones :

Mineralocorticoids : Aldosterone, Deoxycorticosterone,

Fludrocortisone – structures, biological activity and uses. Aldosterone antagonist Spiranolactone.

Glucocorticoids : Cortisone & Hydrocortisone – Structure, biological actions, uses.

UNIT - VII

Water soluble vitamins. Nomenclature, deficiency diseases, structure elucidation of thiamine and riboflavin.

UNIT - VIII

Fat soluble vitamins Nomenclature, deficiency diseases, structure elucidation of Vitamin D2 and Vitamin E riboflavin.

TEXT BOOKS

1. O.P. Agarwal, Natural products by. Vol. 1 & 2, Goel publications – Meerut.
2. JB Harborne, Phyto Chemical methods.
3. I L Finar, Organic chemistry, Vol. 1 & 2, the English language book society, London, New Delhi.

REFERENCES

1. RT Morrison and R.N BOYD, Organic chemistry, Allyn and Bacon, inc., boston
2. Me – Wolf, ed., Burger's medicinal chemistry, J. Wiley & sons, NY.
3. F.G Mann & B. Saunders, Practical Organic chemistry Longmans green & Co. Ltd., UK.
4. RM. Acheson, an introduction to the chemistry of heterocyclic compounds, Interscience NY.
5. Duquesn & others, Practical pharmacognocny, CBS Publ.
6. N.R. Krishnaswamy Chemistry of Natural products – Universities Press.

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(R9505) PHARMACEUTICAL JURISPRUDENCE

UNIT-I

Introduction

- | | |
|------------------------------------|-----------------|
| a. Pharmaceutical Legislations | A brief review |
| b. Drugs & Pharmaceutical Industry | A brief review |
| c. Pharmaceutical Education | A brief review. |
| d. Pharmaceutical ethics & policy | |

An elaborate study of the following

UNIT-II

Pharmacy Act 1948

UNIT-III

Drugs and Cosmetics Act 1940 and Rules 1945

UNIT-IV

Medicinal & Toilet Preparations (Excise Duties) Act 1955

UNIT-V

Narcotic Drugs & Psychotropic Substances Act 1985 & A.P. N. D. P.S Rules 1986

UNIT-VI

Drugs (Prices Control) Order 1995.

UNIT-VII

Drugs and Magic Remedies (Objectionable Advertisements) Act 1954 and Rules 1955.

UNIT-VIII

A study of the salient features of the following.

- a. Prevention of Cruelty to animals Act 1960.
- b. AP State Shops & Establishments Act 1988 & Rules 1990.
- c. Factories Act 1948.
- d. WTO, GATT and The Indian Patents Act 1970
- e. Pharmaceutical Policy 2002.

Note: The teaching of all the above Acts should cover the latest amendments.

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TEXT BOOKS

1. B.M.Mithal, Text book of Forensic Pharmacy, publ by Vallabh Prakashan
2. Prof. Suresh Kumar J.N, Text book of Forensic Pharmacy by, Frontline Publications
3. C.K.Kokate & S.B.Gokhale, Textbook of Forensic Pharmacy

REFERENCE BOOK

1. Bare Acts and Rules Publ by Govt of India/state Govt from time to time.
2. AIR – reported judgments of Supreme Court of India and other High Courts
3. Pharmaceutical policy of India
4. Notification from NPPA
5. Vijay Malik, Drugs & Cosmetics act 1940 and Rules, Eastern Law House Co. Delhi, Kolkata.
6. K.Sampath, Pharmaceutical Jurisprudence (Forensic Pharmacy)

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(R9506) ADVANCED ENGLISH COMMUNICATION SKILLS LAB**1. Introduction**

The introduction of the English Language Lab is considered essential at 3rd year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

Gather ideas and information, to organise ideas relevantly and coherently. Engage in debates.

Participate in group discussions.

Face interviews.

Write project/research reports/technical reports.

Make oral presentations.

Write formal letters.

Transfer information from non-verbal to verbal texts and vice versa.

To take part in social and professional communication.

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2. Objectives :

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

Further, they would be required to communicate their ideas relevantly and coherently in writing.

3. Syllabus :

The following course content is prescribed for the Advanced Communication Skills Lab:

UNIT – I

Fundamentals of interpersonal communication – starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.

UNIT – II

Vocabulary building – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.

UNIT – III

Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.

UNIT – IV

Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

UNIT – V

e-Mail – content, formats – formal/informal. Structure, etiquette, structure and presentation.

UNIT – VI

Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-sets, summary, formats and styles, letter-writing.

UNIT – VII

Reading comprehension – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading.

UNIT – VIII

Technical Report writing – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.

4. Minimum Requirement

Computer aided multimedia language lab with 60 systems with LAN facility with speakers, head phones and a teacher console to accommodate 60 students

5. Suggested Software

The software consisting of the prescribed topics elaborated above should be procured and used.

6. Books Recommended:

1. Effective Technical Communication, M. Ashraf Rizvi, Tata Mc. Graw-Hill Publishing Company Ltd.
2. A course in English communication by Madhavi Apte, Prentice-Hall of India, 2007.
3. Communication Skills by Leena Sen, Prentice-Hall of India, 2005.
4. Academic Writing- A Practical guide for students by Stephen Bailey, Rontledge Falmer, London & New York, 2004.
5. Body Language- Your Success Mantra by Dr. Shalini Verma, S. Chand, 2006.
6. Books on TOEFL/GRE/GMAT/CAT by Barron's/cup
7. IELTS series with CDs by Cambridge University Press.
8. Technical Report Writing Today by Daniel G. Riordan & Steven E. Pauley, Biztantra Publishers, 2005.
9. Basic Communication Skills for Technology by Andra J. Rutherford, 2nd Edition, Pearson Education, 2007.
10. Communication Skills for Engineers by Sunita Mishra & C. Muralikrishna, Pearson Education, 2007.
11. Objective English by Edgar Thorpe & Showick Thorpe, 2nd edition, Pearson Education, 2007.
12. Objective IELTS by Michal Black & Wendy Sharp, Cambridge University Press.
13. Objective IELTS by Michal Black & Annette Capel, Cambridge University Press.
14. Cambridge Preparation for the TOEFL Test by Jolene Gear & Robert Gear, 4th Edition.
15. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press.
7. English Skills for Technical Students by Orient Longman
8. English for Professional Students, by S S Prabhakara Rao.

TEXT BOOKS

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1. Strengthen Your English, Bhaskaran & Horsburgh, Oxford University Press
2. English for Technical Communication, K R Lakshminarayana, SCITECH
3. Strategies for Engineering Communication, Susan Stevenson & Steve Whitmore (John Wiley and sons).
4. English for Engineers: With CD, Sirish Chaudhary, Vikas Publishing House Pvt. Ltd. With CD.
5. Basic Communication Skills for Technology, Andrea J Rutherford, Pearson Education Asia.
6. Murphy's English Grammar with CD, Murphy, Cambridge University Press
9. The Oxford Guide to Writing and Speaking, John Seely, Oxford.
10. Grammar Games, Renvoluceri Mario, Cambridge University Press.
11. Everyday Dialogues in English by Robert J. Dixon, Prentice-Hall of India Ltd., 2006.
12. English Technical Communication, Vol. 1 & 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.
13. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP English Pronouncing Dictionary Daniel Jones Current Edition with CD.
14. Spoken English- R. K. Bansal, J. B. Morrison and Orient Longman 2006 Edn.
15. A Practical course in English Pronunciation, (with two Audio cassettes) by J. Sethi, Kamlesh Sadanand & D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.
16. Pronunciation Practice Activities: A resource book for teaching English pronunciation by Martin Hewings, Cambridge University Press, 2004.
17. English Pronunciation in use by Mark Hancock (with 4 CD)- Cambridge University Press, 2005.
18. A text book of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)
19. English Skills for Technical Students, WBSCTE with British Council, OL

20. Effective Technical Communication, M. Ashraf Rizvi, Tata Mc. Graw-Hill Publishing Company Ltd.
21. Professional Presentations- A Video based course by Malcolm Goodale, Cambridge University Press, 2005.
22. A course in English communication by Madhavi Apte, Prentice-Hall of India, 2007.
23. Communication Skills by Leena Sen, Prentice-Hall of India, 2005.
24. Academic Writing- A Practical guide for students by Stephen Bailey, Rontledge Falmer, London & New York, 2004.
25. Body Language- Your Success Mantra by Dr. Shalini Verma, S. Chand, 2006.
26. Books on TOEFL/GRE/GMAT/CAT by Barron's/cup.
27. IELTS series with CDs by Cambridge University Press.
28. Anderson, Technical Communication-Thompson publications
29. Delta's Key to the Next Generation TOEFL Test, Nancy Gallagher.
30. Technical Report Writing Today by Daniel G. Riordan & Steven E. Pauley, Biztantra Publishers, 2005.
31. Basic Communication Skills for Technology by Andra J. Rutherford, 2nd Edition, Pearson Education, 2007.
32. Communication Skills for Engineers by Sunita Mishra & C. Muralikrishna, Pearson Education, 2007.
33. Objective English by Edgar Thorpe & Showick Thorpe, 2nd edition, Pearson Education, 2007.

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(R9507) MEDICINAL CHEMISTRY – I LAB

- Synthesis of some medicinal compounds and their analogues.
- Barbituric acid from Diethyl Malonate.
- Phenyntion from Benzoin or Benzil.
- Paracetamol from *para*- nitro phenol or *para*- aminophenol.
- 1,4- di hydro pyridine from ethyl aceto acetate.
- Quinazolinone from anthranilic acid via benzoxazinone.
- Sulfanilamide from acetanilide
- Isoniazid from *g*-picoline.
- Antipyrine from ethyl aceto acetate.
- Benzocaine from *para*- nitro benzoic acid.

II. Qualitative estimation of some functional groups. *

- Halogens (Strepheno's method).
- Hydroxyl groups (acetylation method)
- Methoxyl groups (Zeissel's method)
- Carboxyl groups (silver salt method).

* Not to be given in End Examinations

REFERENCES

- A.I. Vogel, Text Book of Practical Organic Chemistry, 5th Edition.
- R.K. Bansal, Laboratory Manual of Organic Chemistry.
- F.G. Mann & B.C. Saunders, Pratical Organic Chemistry, 4th Edition.

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(R9508) PHARMACEUTICAL TECHNOLOGY – II LAB

- Experiments to illustrate preparation, stabilization, physical, chemical and biological evaluation of pharmaceutical products like capsules, tablets, parenterals, microcapsules etc. (Minimum of two dosage forms in each category.)
- Evaluation of materials used in pharmaceutical packaging such as Glass, Plastic, Cottons (Hydrolytic resistance test of Glass and light absorption test of rubber closures)

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(R9509) PHARMACOLOGY – II LAB

1. Introduction to Experimental Pharmacology
Preparation of different solutions for experiments.
Drug dilutions, use of molar and w/v solutions in experimental Pharmacology.
Common laboratory animals and anesthetics used in animal studies.
Commonly used instruments in experimental pharmacology.
Some common and standard techniques.
Bleeding and intravenous injection, intragastric administration.
2. Experiments on intact preparations:
Study of different routes of administration of drugs in mice/rats.
3. Experiments in Central Nervous system:
Recording of spontaneous motor activity, stereotype, analgesia, anticonvulsant activity, anti inflammatory activity,
4. To study the effect of autonomic drugs on rabbit's eye
5. To study the effects of various agonists and antagonists and their characterisation using isolated preparations like frog's rectus abdominus muscle and isolated ileum preparation of rat & guinea pig.

Experiments on Isolated Preparations:

- i. a. To record the concentration response curve (CRC) of acetylcholine using rectus abdominus muscle preparation of frog.
b. To study the effects of physostigmine and d tubocurarine on the crc of acetylcholine using frog rectus abdominus muscle preparation of frog.
c. To record the CRC of 5 HT on rat fundus preparation.
d. To record the CRC of histamine on guineapig ileum preparation.
- ii. a. To study the inotropic and chronotropic effects of drugs on isolated frog heart.
b. To study the effects of drugs on normal and hypodynamic frog heart.
6. Experiments pertaining to analgesia, anti-convulsant activity, anti-inflammatory activity (*Only demonstration*).
Experimental Pharmacology, M.C. Prabhakar.

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(R9510) CHEMISTRY OF NATURAL DRUGS LAB

1. Preparation of different alkaloid testing reagents like Dragendroff, Mayer' Wagner's, etc. and testing some alkaloids and plant extracts using these reagents.
2. Identification of alkaloids by specific colour tests.
3. Tests for steroids, steroidal glycosides and cardiac glycosides. Liberman- Burchard test, Salkowski reaction, Kedde reaction, etc.
4. Tests for flavanoids and their glycosides. Shinoda Test (Mg /Hcl test). Fecl₃ test.
5. TLC end examination of alkaloids, steroids, steroidal glycosides and cardiac glycosides.
6. Identification of natural products.
7. Extraction of caffeine from tea leaves.
8. Extraction of lactose from milk.
9. Extraction of nicotine from tobacco.
10. Extraction of piperine from black pepper.
11. Extraction of lycopene from tomatoes.
12. Extraction of beta - carotene from carrots.
13. Volatile oil production by steam distillation (*Demonstration only*)

TEXT BOOKS

1. Indian Pharmacopoeia – 1996.
2. Weagners, Phyto Chemical Methods of Drug Analysis.
3. C.K. Kokate, Practical Pharmacognosy