OSMANIA UNIVERSITY

Faculty of Pharmacy

SCHEME OF INSTRUCTION, EXAMINATION AND EVALUATION

(Effective for Batches Admitted from 2016 – 17 Academic Year Onwards)

Program Code: 881 B. Pharmacy (Third Year)

SEMESTER - VI

Course Code	Description	Course Title	Hours/Week			Credits	Marks		Duration of Exam
			L	T	P		Internal	End Exam	
PY.07.881.6.1.T	PS, CORE	Physical Pharmacy-II	4	0	-	4	30	70	3
PY.07.881.6.2.T	PS, CORE	Pharmacology-II	4	0	-	4	30	70	3
PY.07.881.6.3.T	PS, CORE	Pharmacognosy-II	4	0	-	4	30	70	3
PY.07.881.6.4.T	PS, FC	Forensic Pharmacy (Pharmaceutical Jurisprudence)	3	0	-	3	30	70	3
PY.07.881.6.5.T	PS, IDE	Pharmaco Therapeutics/Quality Assurance	3	0	-	3	30	70	3
PY.07.881.6.6.P	PS, CORE	Physical Pharmacy Practical	0	0	4	2	30	70	4
PY.07.881.6.7.P	PS, CORE	Pharmacology Practical	0	0	4	2	30	70	4
PY.07.881.6.8.P	PS, CORE	Pharmacognosy-II Practical	0	0	4	2	30	70	4
			18	0	12	24	240	560	

PHYSICAL PHARMACY – II

Subject Code : PY.07.881.6.2.T **Sessional 30**
Periods / Week: 4credits:4 **Examination 70**
Nature of Exam: Theory **Exam Duration: 3 Hrs**

Unit – I

Solubility and Distribution Phenomena

Definitions, Expressions, Phase rule, Solvent - Solute interactions - polar solvents and semipolar solvents, Solubility of gases in liquids - effect of pressure and temperature, Salting out, Effect of chemical reactions, Solubility calculations. Solubility of liquids in liquids ideal and real solutions, Complete and partial miscibility, Influence of foreign substances, Three component systems, Dielectric constant and solubility. Solubility of solids in liquids Ideal and non ideal solutions solvation and association in solutions. Solubility of salts in water, Solubility of slightly soluble and week electrolytes, Calculating solubility of weak electrolytes as influenced by pH, Influence of solvents on the solubility of drugs, Combined effect of solvents. Distribution of solutes between immiscible solvents - Effect of ionic dissociation and molecular association on partition & extraction, Solubility and partition coefficients, Preservative action of weak acids in emulsions, Drug action and partition coefficients.

Unit – II

Chemical Kinetics

Rates and orders of reactions - Rate, order of reaction, Molecularly, Specific rate constant, Units of basic rate constants, Mathematical treatment of rates.

Apparent zero order kinetics. First order reactions. Second order reactions. Determination of order of a reaction. Elementary idea complex reactions. Specific and general acid base catalysis. Influence of temperature and other factors on reaction rates - Effect of solvents, Ionic strength, Dielectric constant, Catalysts and light. Decomposition and destabilization of medicinal agents against hydrolysis, Oxidation. Kinetics in the solid state. Accelerated stability analysis.

Unit – III

Interfacial Phenomena

Introduction, liquid interphases - Surface and interfacial tensions, Surface free energy, measurement of surface and interfacial tensions, Spreading coefficient. Adsorption at liquid interfaces - Surface active agents, Systems of hydrophilic - Lipophilic classification, Solubilization and detergency. Types of monolayer at liquid surfaces, applications of amphiphiles. Absorption at solid interfaces - Solid/Gas interface - Solid/Liquid interface. Electric properties of interfaces - Electric double layer, N emst and zeta potentials.

Unit – IV

Colloids and Micromeritics

Dispersed systems, Size and shape of colloidal particles - pharmaceutical application, Types - Lipophilic, Lipophobic and Association colloids, Comparison of properties of colloidal sols; Optical, Kinetic and Electric properties of colloids, Solubilization gels - Structure, Properties and Applications.

Particle size and size distribution - average particle size, particle size distribution, number and weight distributions, Particle number; Methods for determining particle size - optical microscopy, sieving, Sedimentation, Particle volume measurement, Particle shape and surface area, Methods for determining surface area - Absorption methods, Air permeability methods; Derived properties of powders - Porosity, Packing arrangements, Densities, bulkiness, Flow properties.

Unit – V

Rheology and Polymers
Rheology of Pharmaceutical Fluids: Newtonian and Non-Newtonian Systems;
Newtonian systems - Laws of flow, Kinematic viscosity, Effect of temperature.
Non newtonian systems - Plastic and Pseudoplastic dilatant flow.
Thixotropy - Measurement of thixotropy, Thixotropy in formulation.
Determination of rheologic properties - choice of viscometer, Capillary, falling sphere, Cup and bob, and cone and plate viscometers. Psychorheology. Applications to pharmacy.
Polymers: Definition, Types of Polymers, Water Soluble and Water Insoluble Polymers; Polymers as Thickening Agents; Pharmaceutical Application of Polymers;
Examination: One question from each unit with internal choice.

Text Books

1. A.N. Martin, Arthur Cammarata and J. Swarbrick, Physical Pharmacy by 3rd ed, K.M. Varghese & Co, Bombay.

2. C.V.S. Subrahmanyam, Textbook of Physical Pharmaceutics, 2nd Edition, Vallabh Prakashan, Delhi, 2004.

Reference books

1. Tutorial Pharmacy by Cooper & Gunn, ed S.J. Carter, CBS Publishers, Delhi.
2. Physical Pharmaceutics by Shotton & Ridgway, Oxford University press, London.
3. Remington's Pharmaceutical Sciences, ed A.R. Gennaro, Mack publishing Co, PA.

PHARMACOLOGY – II

Subject Code: PY.07.881.6.2.T **Sessional 30**
Periods/week: 04 credits:4 **Examination 70**
Nature of Exam: Theory **Exam Duration: 3 Hrs**

Unit – I

Chemotherapy of Infections and Cancer
Basic Principles of Chemotherapy; Systemic Pharmacological study of Anti-bacterial, Antiviral, Anti-fungal, Anti-protozoal and Anti-helmenthic drugs; Cancer Chemotherapy

Unit – II

Pharmacology of Autocoids: Local Hormones
Anti-histamines: Histamine, Serotonim and ergot alkaloids; Vasoactive principles; Eicosanoids; Prostagladins, Thromboxanes, Leukotrines and related compounds. Nitric oxide, Donors and inhibitors. Para Drugs acting on blood and blood forming agents - Coagulants, Anti-coagulants, Haematinics (iron, vitamin-B12, Folic acid) and Thrombolytic Agents.

Unit – III

Pharmacology of Endocrine System
Systemic Pharmacological study of Pituitary Hormones, Sex Hormones, Oral Contraceptives, Oxytocics and Uterine relaxants; Pharmacology of thyroid and Anti-thyroid drugs, Insulin, Oral hypoglycemics, Glucagon and Adrenocortico steroids;

Unit – IV

Bioethics and Bioassay Of Some Selective Drugs
Principles of Bioethics, Bioethics of Animals used in Bioassay studies; Principles of Bioassays; Official Bioassays; Biological assay of anti-haemophilic fraction, Heparin sodium, Chorionic gonadotropin, Corticotropin, Insulin, Oxytocin, Vasopressin and Adrenaline; Biological assay of diptheria anti-toxin, anti-rabies vaccine, tetanus anti-toxin and old tuberculin vaccine;

Unit – V

Toxicology of Drugs and Clinical Pharmacology
Principles of Toxicology; Definition of Poison; General principles of treatment of poisoning with special reference to barbutirates, Opium and Organophosphorus toxicity;
Treatment of Poisoning for the following toxins: Methyl Alcohol, Heavy metals, Paracetamol and Digitalis
Introduction to Clinical pharmacology and Phases of clinical trials;

Examination: One question from each unit with internal choice.

Text Books

1. Essentials of Medical Pharmacology, K.D. Tripati., Jaypee Brothers Medical Publishers
2. Pharmacology and Pharmacotherapeutics., R.S.Saathoskar and S.D. Bandarkar., Popular Prakashan, Mumbai.,
3. Text Book of Pharmacology by Rang and Dale

Reference Books

1. Goodman and Gilman's: "The Pharmacological basis of Therapeutics" by Joel G. Hardman and Lee E. Limbard., Pergamon Press
2. Lewis's Pharmacology by J. Crossland., Churchil Livingstone Publications
3. Basic and Clinical Pharmacology by Katzung B.G., Prentice-Hall
4. Clinical pharmacology by Lanzence

PHARMACOGNOSY-II

Subject Code : PY.07.881.6.3.T **Sessional 30**
Periods / Week: 4 credits:4 **Examination 70**
Nature of Exam: Theory **Exam Duration: 3 Hrs**

Systematic Phamacognostic study, which includes sources (Biological and Geographical) diagnostic characters, chemical constituents, chemical tests, uses, substituents and adulterants of the crude drugs mentioned in the following units. MICROSCOPICAL CHARACTERS OF ONLY THE DRUGS UNDERLINED SHALL BE STUDIED.

Unit – I

Alkaloids
Introduction, definition, classification, isolation, tests, chemical nature and uses of Rauwolfia, Vinca, Nuxvomica, opium, ipecac, belladonna, dattura, lobelia, vasaka, kurchi, ephedra, cinchona, colchicum, aconite, punemava, shankhupushpi, tobacco.

Unit – II

Glycosides
Introduction, Definition, Classification, Isolation, tests, chemical nature and uses of Senna, aloes, rhubarb, digitalis, squill, dioscoreia, liquorice, momordica, black mustard, ammi, psoralia, gentian, picrorriza, ashwagandha, gokhru, kalmegh, stropanthus, shatavari, brahmi, quassia, gymnema.

Unit – III

Phytopharmaceuticals
Chemistry, Tests, Isolation, Characterization and Estimation of Following Constituents 1. Sennosides from Senna 2. Caffine from tea 3. Cineole from eucalyptus oil
4. Quinine from cinchona 5. Carvone from dill 6. Tannic acid from myrobalan
7. Rutin, hesperidin from citrus fruits.
Introduction, definition, classification, isolation, tests, chemical nature and uses of Volatile Oils and Resins from following Plant Sources: Fennel, Clove, Cinamon, Gaultheria oil, Artemisia, Taxus, Capscium, Turmeric, Podophyllum, Guggul Asafoetida and Pyrethrum.

Unit – IV

Tissue Culture
History, introduction, callus culture, suspension culture, Immobilization of culture, single cell culture, organogenesis and embryo culture.
Production of secondary metabolites, biotransformation and clonal propagation, Significance and application of plant tissue culture.

Unit – V

Herbal Medicines
Herbal medicines in India, practice, regulations, Quality Control and Standardization of Raw Materials. Types of herbal formulations and products.

Some Traditional Plant Medicines as a source of New Drugs
Introduction to dosage form of Ayurveda - Aristavas, Asawas, Chumas, Bhasma, Leyhas, Ghritams, Rasayanam and Kashayams.

Examination: One question from each unit with internal choice.

Text Books

1. **Trease and Evans, Pharmacognosy by W.C. Evans, Elseview Ltd., London, UK/ Vailliers Tindal Easbourn UK.**
2. **Pharmacognosy by C.K. Kokate, Nirali Publication, Pune.**
3. **Pharmacognosy by T.E. Wallis CBS publishers and Distributors, Delhi.**

Reference Books

1. **The Ayurvedic pharmacopoeia of India I-III Govt. of India, Ministry of Health and Family Welfare Dept. of Indian system of medicine and Homeopathy, New Delhi.**
2. **Herbal Drug Industry, Eastern publishers, New Delhi.**
3. **Natural Products by O.P. Agarwal Vol.I & II Goel publications, Meerut.**
4. **Text Book of Pharmacognosy by Brady & Taylor.**
5. **Tissue culture and plant science by street**
6. **An Introduction to plant Tissue culture by M.K. Razdan, Oxford & IBH publishing Co. Pvt. Ltd. – New Delhi & Calcutta.**

FORENSIC PHARMACY
(PHARMACEUTICAL JURISPRUDENCE)

Subject Code : PY.07.881.6.4.T **Sessional 30**
Periods/week : 04 credits:4 **Examination 70**
Nature of Exam: Theory **Exam Duration: 3 Hrs**

Unit – I

1. Evolution of Pharmaceutical and Drug Legislation in India.
2. The Pharmacy Act 1948.
3. Code of Pharmaceutical Ethics.
4. Consumer protection Act 1986.
5. Narcotic and Psychotropic substances Act 1985.

Unit – II

Drugs and Cosmetics Act 1940 and Drugs & Cosmetic Rules 1945 (also amendments).

1. Administration of the Act – The controlling and licensing regulation at state level and central level (the organisation, function and duties of state and central drug control authorities).
2. Drugs & Cosmetic Act Rules – the provisions related to
a. The manufacture of drugs (other than homeopathic) including schedule C, C(1), F, F(1) and X drugs and cosmetics.
b. The sale and distribution of drugs (other than homeopathic) including schedule C, C(1), F, F(1) and X drugs and cosmetics.

Unit – III

Drugs & Cosmetics Act Rules

1. (i.) The import and export of drugs & cosmetics.
(ii) Labelling and packing requirements for all categories of drugs & cosmetics.
2. (i.) List of schedules to the Drugs & Cosmetics Rules.
(ii.) Detailed study of schedule M (new), U and Y.
3. Medicinal & Toilet preparations (Excise Duties) Act 1955.

Unit – IV

1. Drugs and magic Remedies (Objectionable Advertisments) Act 1954.
2. Prevention of Food Adulteration Act 1954 (salient features)
3. The Factories Act 1948 and the Amendment (salient features.).

Unit – V

IPR's and Patent Laws

1. Intellectual Property Rights – a brief introduction to various IPR's.
2. Indian Patent Act 1970 and the Amendments to the Act (upto date with reference to WTO Agreement)

a. Introduction & Objectives

b. Inventions and Not inventions according to the Act.

c. Procedure of obtaining patent for drugs and pharmaceuticals.

3. Drug Price Control Order (Latest).

4. Pharmaceutical Policy 2002.

Examination: One question from each unit with internal choice.

Text Books

1. Forensic Pharmacy by B.M. Mithal, Vallabh Prakashan.

2. Forensic Pharmacy by Dr. B.S. Kuchekar, A.M. Khadatare and Sachin C. Itkar, Nirali Prakashan, Pune.

3. Drugs and Cosmetics Act 1940 by Vijay Malik, Eastern Book Company, Lucknow.

Reference Books

1. Bare Acts, published by Govt. of India.

2. Patent Act 1970 with patent Rules , published by Taxman Allied services (P) Ltd., 59132, New Rohtak Road, New Delhi – 110005.

3. ISO, International Organisation for Standardisation, Switzerland, 1994.

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Scheme of Instruction		3cheme of Examination	
Total Duration	: 45 hrs	:Xfiaxirnuin h4ark3	100
Periods / Week	: 3	1inerna1 Exe.a	: 0
Credits	: 3	bud Semester	70
Instruction Mode	: Lecture	Loan DuraGon	: Hrs
Subject Code	: FY.07.881.6.5.T		

Course Ot\jcctii es

To ltaiii ilic stiidc•i4is in the drug therapy management oi“ dil’fereiit diseases. TO de'zelop the ‹k 1s iii sitidcnts to idcnti and resolve any drug related problems. To appi eciate the qual it;° .' : :r:extremes.

Co n rsc Outcoines

describe and explain the rationale for dru•_ therap '. Summarize I.he therapeutic approach for manage:item of’ these diseases including reticence to latest a. ailaLie evidence. Discuss the preparation of individualized therapeutic plans based on diagnos is. Descri be the ct iolon '. incidence. dnd ro*nosis associated worth all disease states discussed.

Unit-I

- introduction: Etiopatho*enesis and pharinacoilierap›’ of‘ diseases associated with the folioivin* systems.
- Cardiovascular system: hypenension, conq•estive heart failure. ang,ina pectoris, myocardial infarction, hyperlipidaemias, electrophysiology of heart and arrhythmias.
- Respiratory system: Introduction to pulmonary function test, asthma, chro*'c obstructive airway disease, drug induced pulmonary diseases.

U’nit-I I

- Endocrine sys4em: diabetes, thyroid diseases, oral contraceptives, hormone i eplacemer.' therapy, osteoporosis.
- « Ophthalmology: glaucoma, conjunctivitis—viral and bacterial.

unit-m

General prescribing guidelines for

a. Paediatric patients.
b. Geriatric patients,
c. ?re*i:ancy and lactation.

Unit-IV

2afzctious diseases: guidelines for the rational use of antibiotics and sur¿ica] prnpl ytaxis. tubeTculosis, ir cninpitis, rcspiratory tract infections, gastroenteritis, endocarditis, sapticacinia **urinary** tract infections, protozoal infmtio'‹. 11IV@ oppo+tunistic infections, fun*aI int”ec::0ns, viral infections, ¿conorrhea and syphilis.

- Museuloskclctat tiny8thogencsts and yltarmacot\tcrnyy : rheumatoid art)fiitis, ostcoart1lritiS, gput, spondylitis, system ie lupus.
- Oncnl‹› }’: basic princ,iples of cancer therapy, introduction to cancer c)1cmothcrapcutic agents, chemothcrapy of brcast cancer, leukemia, rt›8n3hCffiCFtt OF chci sotl crapy nausea and emesis.
- D«rmatology: psoriasis, °o«ñies, eczema, inpctigo.

’9JXT HOOKS

1. Clinical Pharmacy and therapeutic s- koi;er and Waiter. hurChill Livingstone publication.

?. Pharmacotlierap : A Pathophys' !o ie approach -3oseplj T D‹piro .et .ai .Appleton & Law.ge.

REFERE*'CE POOKS

1. Patholo5ic basis of disease —Robins SL. W .6. Saunders publication

Pathology and therapeutics for Pharmacists: A Basic fr›r Cl inical Pharmacy Practice- Gin a‹id Harris, Cha{)tD-N And Hali pu1›licati‹9ti

3. Clinical pm ,racy and Tlierapetitics- Eric. T. i3erfiridal, \Vi1liams and ;\'iifins publication

4. Appiied therapeutic The clinical use of Drugs.Lloyd and Koda- Kimble i4iA
5. Avery's Drug treatment, 4^ cdi, l9S7. Adis International Limited

QUALITY ASSUWtN CE

{nstrucñ‹ n		Scheme of Examination	
	60 Hrs	Max. Marks	100
	Hrs.	h ‹l .SL°i ester	?0
Mo‹4e	lecture	End Semester	75
Code	PY.09.885. 1 5.4	Exam Duration	3 Hrs.

Objectives:

comprehensive understanding and acquiring professional competency /r g/oba/ *qual'ifi systems and regulatory requirements in the pharmaceuti*cal industry.

and implement a robust quell assurance system *in* an *organization* Louvre's *quail'*

Quality Assurance Systems: Basic ept lity mol & quality assurance, fJ9cfons, sour of variation, quail assurance for raw materi Is, king materials & finished products (specifcatiors, receipt, testing, sampling and celficete of I , production (c hange control, aseptic ptccess conttnT, temperature, pressure ht+idir/control te , t air flow pattern, microbiological rroniioring) buildings & facilities (design and conr.traction fea ation materials, lipLting, air hanc,tnq systems, sanitation & maintenance) equipments (const o leaning and maintenance, calibration & handling).

In•Process Quality Contr ortance, inspection, fPQC tests for tablets (weigh! variation. hardness, thickness, friabi\ity, ' " tesb and contentuiiiformilg, suspensions and emulsions (ap arunce ord feel, volume chec vis , particle size distribution, electrical conductivity and content uniformi!}') and pareutefa {p ecu, c1ari , content uniformly, integrity of seals and particulate matter) ProLiems encoun o e shooting.

Quality Systems: ISO- Quality C0nmpts, Quality Management — Vccabu\ay, ISO 9000 se \cs- Standards, Cuidelines and Selection, Requirements, 150 — Certification Procedure, ISO 14000

Audits: Gk\P compLance audit, Defnit\on summat Audit pc!'• , Internal and External Aud'its Second Party Audio, External third pany audits.

Unit - IV :

Quality Control Laboratory: Scope, Organization, Personnel — DesirableQualities of Analyst Responsibilities of Key Personnel in the Ouality Central Lab. Operation Systems and Procedures in QC Lsb, Wolsheet, Test Methods, Evaluation of Tesl Results. Safety Guidelines in QC Lab. Analytical

Documentation: Good Leer entation Practices, Route Cause Analysis, Cozective Action Preventive action (CAPA}, Oul I P ifications (OOS) ar.d out of Trend {OOT);

Impurity Profile: lures of Inn lJfit'1 , their Ei‹ect in Oral Stab\ii‹y and Therapeutic ,^.ction Determinationof §apurtties in Bulk drugs and Formulation - Isolation. Chr lcterization, AnalvtM Methods and Fuuoe\ines as IN and WHO for impurity and Related Substances, Concept of Puri(y Angle. i hreshold and flag,

8tudy of Compendia: Evduiiun, Study of Pads of ?Dmpendia like Phiaies., General Nc*!ces, Monoor8phs, Comparative Posture of IP, USP, BP.

books o d Re‹erences:

5' Eo., Hi.aIa\a publish ◦ 9 house, Hyderabad, 2W.

7. .Sharma PP. How to Practice GMPs, 4th ed., Vandana PubliCdtinns Pvt. Ltd., Delhi, 2004.

Pharma PP How to Practice SLP, Vacdana Publications PvL Ltd., Delhi, 2000

4. .Dualiiy.Assurance of Pharmareutial (A Cswpendiurn of Guidelines and Selected fvt ’z Vol. 15li, WHO, C-rera, Pha a Booi‹ Synoiate, Hyderabad, 2@2.

"• •5, Basic Tests for Ph aceut\ca\ Su znas, h’HO, Geneva, e India traveler

T. Mehra ML. Good Manufacturing Pfoc'ices (GMP}, University Boot A

.8. Subrahmanyam.CVS; PLsmaceuticE! Production and fdanageme 00 , ltabh Prak2Shah, NewDeth’i.

9, *DA.* Beir/, Statistics! Methodology in Pea , .Dekker, NY.

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*-11. Y. Artjaneyuto, R. Marayya. Quality Ass rent in Phawaceutical Industiy,

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PHYSICAL PHARMACY PRACTICALS

Subject Code : PY.07.881.6.6.P **Sessional 25**
Periods / Week: 6 **Examination 50**
Nature of Exam: Practical **Exam Duration: 4 Hrs**

List of Experiments

Minimum 12 experiments of the following shall be conducted

1. **Determination of bulk density and flow properties of powders/ granules.**
2. **Determination of viscosity of liquids using Ostwald viscometer/ Redwood viscometer.**
3. **Determination of surface tension by stalagmometer method.**
4. **Determination of HLB of surfactant- Saponification method.**
5. **Determination of CMC of a surfactant-Drop count method using stalagmometer.**
6. **Ternary phase diagram for a three component system comprising of alcohol, water and benzene.**
7. **Determination of adsorption behavior of acetic acid on charcoal.**
8. **Determination of CST of Phenol-water system**
9. **Effect of sodium chloride on CST of phenol water system.**
10. **Determination of solubility- Heat of solution method.**
11. **Determination of first order reaction rate constant - Acid hydrolysis of ester.**
12. **Preparation of pharmaceutical buffer and determination of its buffer capacity.**
13. **Determination of second order reaction rate constant- Alkali hydrolysis of ester.**
14. **Determination of ionization constant by conductivity method/ distribution method.**
15. **Determination of distribution coefficient of benzoic acid in benzene and water.**
16. **Determination of particle size distribution - Microscopy.**

Reference Books

1. **C.V.S Subrahmanyam and S.G. Vasantharaju, Laboratory Manual of Physical Pharmacy, Vallabh Prakashan, New Delhi, 2005.**
2. **C.V.S Subrahmanyam and J. Thimma Setty, Laboratory Manual of Physical Pharmaceutics, Vallabh Prakashan, New Delhi, 2002.**
3. **Manavalan. Ramasamy, Physical Pharmaceutics, Vignesh Publishers, Chennai, 2004.**

PHARMACOLOGY PRACTICALS

Subject Code : PY.07.881.6.7.P **Sessional 25**
Periods / Week: 4 credits:2 **Examination 50**
Nature of Exam: Practicals **Exam Duration: 6 Hrs**

List of Experiments

1. **An introduction to different equipments used in Pharmacology laboratory**
2. **Effect of routes of administration on the action of drugs.**
3. **Dose response curves of Acetyl cholins.**
4. **Demonstration of different types of antagonism on isolated tissue preparations.**
5. **Effect of different electrolytes or drugs on isolated forg's heart.**
6. **Effect of drugs on isolated frog rectus abdominus (any four drugs).**
7. **Bioassay of drugs by matching method**
8. **Bioassay of drugs by graphical (interpolation) method**
9. **Bioassay of drugs by three point and four point methods.**
10. **Effect of various drugs on isolated rabbit intestine / guinea pig ileum**
11. **Hypoglycemic activity of insulin in rabbit.**
12. **Effect of drugs on ciliary movement of frog's esophagus**
13. **Local anesthetic activity on Rabbit eye / Guinea pig! Frog's hind limb withdrawal (Demo).**
14. **Anti-psychotic effect by pole climbing apparatus (Demo)**
15. **To study the analgesic effect of narcotic analgesic by using tail-flic/hot-plate/acetic acid induced writing method. (demo)**
16. **Effect of drug on blood vessels**
17. **Antipyretic effect in rabbits.**

Reference Books

1. **S.K Kulkarni, Hand Book of Experimental Pharmacology, 3rd Edition, Vallabh Prakashan, Hilton and Company, Kolkata, 2005.**
2. **M.N Gash, Fundamentals of Experimental Pharmacology, 3rd Edition, Vallabh Prakashan, Hilton and Company, Kolkata, 2005.**
3. **K.K Pillai, Experimental Pharmacology, 1st Edition, CBS Publications & Distributors, Delhi, 2008.**
4. **R.K Goyal, Elements of Pharmacology, 13th Edition, B.S. Shah Prakashan, Ahmadabad, 2003.**

I - PRACTI

HARMACOG OSY-I CALS

Scheme of Instruction

Total Duration : 60 hrs

Periods / Week : 4

Credits : 2

Instruction Mode : Practical

Scheme of Examination

Maximum Marks : 100

Internal Exam : 30

End Semester Exam Duration : 4 Hrs

Course Objectives

The students should be able to take the trans erse section of crude drug and to id-ntif, t lie binary mixture of powdered crude drup•s. The students should be able to isolate. ans id.:.r'fj the phytoconstituents from crude drugs.

Course Outcomes

The students should be abte to perform leaf constants. to identify the particle size of starch grains and to deter mine the esn art extractive vaiues. The students should be able to perfc•rrn preliminary phytochemical screening and to identify the uno. ganized crude dru3 by various chemica1 tests

Experiments

1. Determination of stomatal number and index.
2. Determination of vein islet number and vein termination number.
3. Determination of fiber length and width.
4. **Determination** of particle size of starch grains by eye piece micrometer
5. Determination of Ash values.
6. **Determination of extractive values.**
7. To perform **preliminary** phytochemical investigation or screeninp• of crude drug.
8. **Determination** of moisture content of crude drug.
9. **Determination of swelling index and foaming index.**
10. Analysis of crude drugs by .heinical tests: Acacia, Agar, gelatin, starch, honey and castor oil.

Recommended bonks :

1. W.C.Evans, T ease and Evans Pharmacognosy, l6th edition, \V.B. Sounders & Co., London, 2009.
2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pf'‹amiacounosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.
3. Text Book of Pharmacognosy by T.E. Wallis
4. Mohammad Ali. Pharmacognosy and Phytocheinistry, CBS Publishers Distribution, i4ew Delhi.
5. Text book of Pharmacognosy by C.K. Kokate, Purohit. C oklalae (2007), 37th Edition, Nirali Prakashan, L'•w Deliii.
6. Herbal drug industry by R.D. Choudhary f996), 1st Edn, Eastern Publisher, New Delhi.
7. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications. New Delhi, 2007
8. Practical Pharmacognosy: C.K. KoKate, Purohit, Gokhlae 9. Anatomy of Crude Drugs by M.A. I;'engar