COLLEGE OF PHARMACEUTICAL SCIENCES

DAYANANDA SAGAR UNIVERSITY

Minutes of the BOS meeting

The 4th Board of studies meeting for the College of Pharmaceutical Sciences, DSU for the academic year 2017-18 was conducted on 22nd October 2016 for framing the syllabus of 3rd year B.Pharm and Pharm.D.

The meeting started at 10.00 am with Dean, Dr. V. Murugan welcoming all the BOS members. Later external members along with the internal subject experts deliberated on the syllabus framed for 3rd B.Pharm / Pharm.D in their respective subjects. During the discussion, various suggestions were put forward, deliberated and suitable changes were made in the syllabus.

The other points which were discussed in the meeting agenda were as below:

1. Increase of intake for B.Pharm programme from the academic year 2017-18 from 60 – 100 students due to demand from Industry and Pharmaceutical Research.
2. Implementation of new syllabus for I B.Pharm / M.Pharm based on PCI norms from the academic year 2017-18, semesterwise.
3. Introduction of IPR (Intellectual Property Rights) as one of the audit subject from the academic year 2017-18 for B.Pharm / Pharm.D course.
4. Implementation of internal marks as per the new PCI norms from the academic year 2017-18.

The above points were debated on, ratified and approved by BOS members.

The meeting concluded with the vote of thanks proposed by Dr. N.B. Sridharmurthy.

Dr. V. Murugan
Dean

CC:1. Honourable Vice-chancellor, DSU
2. Registrar, DSU

Scheme of III Pharm.D in College of Pharmaceutical Sciences
DAYANANDA SAGAR UNIVERSITY, BANGALORE
SCHEME OF STUDY AND EXAMINATION 2015-16

Sl.No.	Subject Code	Subject	CR/ AU	No. of Hours of Teaching			Scheme of Evaluation	
				Lecture	Practical's	No. of Credits	IA marks	Annual Marks
1	15PD301	Pharmacology II	CR	3	--	3	30	70
2	15PD302	Pharmaceutical Analysis	CR	3	--	3	30	70
3	15PD303	Pharmacotherapeutics II	CR	3	--	3	30	70
4	15PD304	Pharmaceutical Jurisprudence	CR	2	--	2	30	70
5	15PD305	Medicinal Chemistry	CR	3	--	3	30	70
6	15PD306	Pharmaceutical Formulations	CR	2	--	2	30	70
7	15PD371	Pharmacology II	CR	--	1.5	1.5	30	70
8	15PD372	Pharmaceutical Analysis	CR	--	1.5	1.5	30	70
9	15PD373	Pharmacotherapeutics II	CR	--	1.5	1.5	30	70
10	15PD374	Medicinal Chemistry	CR	--	1.5	1.5	30	70
11	15PD375	Pharmaceutical Formulations	CR	--	1.5	1.5	30	70
Grand Total 1100				**16**	**7.5**	**23.5**	**330**	**770**
12	15PD391	Intellectual Property Rights	AU	2	--	--	25	50

Continuous evaluation: Self study presentation / survey reports / quiz/ assignments / Laboratory exercises / presentation in seminar & work shops

CR: Credit Subject
AU: Audit Subject

Dayananda Sagar University

College of Pharmaceutical Sciences
Kumaraswamy Layout,
Bengaluru-560078

Continuous Evaluation: Theory courses summary sheet
Class: III B.Pharm (2017-18)

Continuous Evaluation **1. Assignment** **2. a Surprise test b. Quiz** **3. Internal Assessment test (IA test)**

Subject: **Subject Code:**

Sl. No	USN	Name of the Candidate	1. Assignment (5 marks)	2.a.Surprise test (5 marks)	2.b.Quiz (5 marks)	3. IA Test (15marks)	Total CIA (cummulative interal assessment) (30 marks)

Name and Signature of Faculty In charge Name & Signature of H.O.D Dean

Dayananda Sagar University

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Class: III B.Pharm (2017-18)

Continuous Evaluation: Practical Courses Summary Sheet

Continuous Evaluation 1. Practical Evaluation 2. Internal Assessment Test (IA test)

Subject: **Subject Code:**

Sl. No	USN	Name of the Candidate	Record 4	Expt 3	Viva 3	Average (A) 10	IA Test (B) 20	Total CIA (30 marks–A+B) (Cumulative Internal Assessment)

Name and Signature of Faculty In charge

Name & Signature of H.O.D

Dean

III B.PHARM

15BP301	**MEDICINAL CHEMISTRY I**	L	T	P
		3	1	3
Course objectives	➢ The subject deals with the understanding of use of chemical compounds as medicinal agents. ➢ It includes study of history, development fundamental principles of drug therapy and use of chemotherapeutic agents.			
Course Outcomes	➢ The student will be able to understand the use of chemical agents as drugs to treat various diseases and understand their action in the physiological system.			

MEDICINAL CHEMISTRY- I THEORY

Unit-I

I Basic Principles of Medicinal Chemistry

A History and development of Medicinal Chemistry, definition of hit, lead and drug **2**

B Effects of the following physicochemical properties of drug molecules on biological activity: Ionisation, hydrogen bonding, solubility, partition coefficient,protein binding, chelation, surface activity, redox potential and geometrical and optical isomers. **6**

C Principles of drug design (theoretical aspects) :principles of drug action and drug receptor interactions **2**

D Drug metabolism: Biotransformation, sites of biotransformation, General pathways of drug biotransformation, role of cytochrome P-450 and monoaminooxygenase in oxidative biotransformation, oxidative, reductive, hydrolytic and conjugation reactions with examples. Factors effecting drug metabolism. **7**

Unit-II

A study of development of the following classes of drugs including structure activity relationship (SAR), mechanism of action, synthesis of compounds superscribed by 's', chemical nomenclature, generic names,brand names (a few important marketed products) and side effects

II Central nervous system depressants

A General Anaesthetics: Definition, mode of action

1. Inhalation anaesthetics: Halothane[s], Methoxyflurane, Nitrous oxide
2. Ultra shot acting barbiturates: Methohexitol sodium[s], Thiopental sodium
3. Dissociative anaesthetics: Ketamine hydrochloride **2**

B Anxiolytics, sedatives and hypnotics:

1.SAR of Benzodiazepines, Chlordiazepoxide, Diazepam[s], Chlorazepam, Lorazepam, Flurazepam, Alprazolam[s], Triazolam[s], Oxazepam. **2**

V. Murugan (Dr. V. Murugan) (Mrs. Rekha) (Dr. Rajasekharam)

2. Barbiturates: Classification and SAR, Barbital[s], Methobarbital[s], Phenobarbital, Amobarbital[s], Butarbital, Pentobarbital, Secobarbital 2

Miscellaneous sedative hypnotics:
a) Amides and imides: Glutethimide[s], Methyprylon, Methaqualone[s]
b) Alcohols and their carbamate derivatives: Ethchlorvynol, Ethinamate, Meprobamate[s]
c) Aldehydes and their derivatives: Chloral hydrate, Paraldehyde

C Skeletal muscle relaxants: Chlorphenesin[s], Methocarbamol, Chlorzoxazone

D Drugs used in spasticity: Baclofen, Buspirone 4

E **Anticonvulsants:** mechanism of anticonvulsant action
1. Barbiturates: Phenobarbitone, Mepobarbitone
2. Hydantoins: Phenytoin sodium[s], Ethotoin, Mephenytoin
3. Oxazolidinediones: Trimethadione[s], Paramethadione
4. Succinimides: Phensuximide[s], Methsuximide, Ethsuximide
5. Urea and monoacyl ureas: Phenacemide, Carbamazepine[s]
6. Benzodiazepines: Clonazepam[s],
7. Miscellaneous: Primidone, Valproic acid 3

Unit-III

III Adrenergic agents

A Adrenergic neurotransmitters and their biosynthesis and metabolism, adrenergic receptors their distribution and actions mediated by them 3

B Sympathomimetics
1. Direct acting agents, definition and examples: phenylethylamine,Noradrenaline.
2. Indirect acting: isoproterneol[s],terbutaline
3. Mixed acting: Ephedrine, clonidine[s]
4. Alpha adrenergic receptor agonists:ergotamine
5. Beta adrenergic receptor agonists:Pseudoephedrine
6. Aliphatic amines: triaminoheptane,cyclopentamine[s]
7. Imidazoline derivatives: Naphazolines, tetrahydrazoline, oxymetazoline, xylometazoline.

5

C. Adrenergic blocking agents:
1. Alpha blockers:
a) Non selective: Tolazoline
b) Irreversible blockers: Phenoxybenzamine[s]
c) Alpha1 blockers: Prazosin[s], Doxazosin
d) Alpha2 blockers: Yohimbine.
2. Beta blockers:
a) Non selective blockers: Propranolol[s],Timolol, Pindolol,
b) Beta1 blockers: Acebutolol, Atenelol, Metaprolol[s]

c) Betablockers with alpha1 antagonistic activity: Labetalol, Carvedilol 3

IV Cholinergic drugs and related agents

1. Cholinergic neurotransmitter: Biosynthesis, metabolism and functions of acetylcholine
2. Cholinergic receptors: Nicotinic, Muscarinic and their subtypes 2

A Cholinergic agonists:

1. Stereochemistry and SAR, Acetylcholine, Methacholine, Carbachol, Bethanechol,
2. Cholesterase inhibitors:

a) Reversible: Mode of action, Physostigmine, Neostigmine[s], Tacrine

b) Irreversible: Mode of action, Malathion, Parathion, Pralidoxime 3

B Cholinergic blockers:

1. Postganglionic blockers: Atropine, Hyoscyamine, Scopolamine, Homatropine
2. Synthetic agents: Clidinium, Dicyclomine[s], Propantheline, Benztropine, Chlorphenoxamine.
3. Ganglionic blockers: Trimethaphan, Mecamylamine
4. Neuromuscular blockers: Mode of action, Tubocurarine, Metocurine, synthetic compounds with curare activity-decamethonium bromide 3

Unit-IV

V Local anaesthetics

A Definition, classification, and mechanism of action

B SAR of lidocaine and benzocaine derivatives

C 1. Benzoic acid derivatives: Hexylcaine, Cyclomethicaine, Piperocaine

2. Aminobenzoic acid derivatives: Benzocaine, Procaine[s], Procainamide
3. Lidocaine derivatives (Anilides): Lidocaine[s], Prilocaine
4. Miscellaneous: Dimethisoquin, Dibucaine 4

VI Histamine and antihistaminic agents

A Histamine: receptors and its actions

B Antihistaminics: SAR of H_1 antagonists

1. Aminoalkyl ethers: Diphenhydramine HCl[s], Bromodiphenhydramine, Doxylamine
2. Ethylene diamines: Tripelenamine, Pyrilamine
3. Propylamine derivatives: Pheniramine, Chlorpheniramine[s]
4. Phenothiazine derivatives: Promethazine[s], Trimeprazine
5. Piperazine derivatives: Cyclizine, Meclizine, Cetrizine[s]
6. Miscellaneous compounds: Phenindamine, Cyproheptadine

C H_2 antagonists: Mechanism, Cimetidine, Ranitidine, Famotidine

D Gastric proton pump inhibitors: Mechanism of action, Omeprazole[s], Pantaprazole, Rabiprazole. 7

Unit-V

VII Analgesic agents

A. Structure and uses of Morphine, Codiene, Diacetyl morphine

B. Narcotic antagonists: Structure and uses of Nalorphine, Levalorphan, Naltrexone, Naloxone

C. Antitussive agents: Structure and uses of Dextromethorphan, Noscapine
D. SAR of morphine 6

E. Anti-inflammatory agents
a) Salicylic acid derivatives: Aspirin, Sodium salicylate
b) N-aryl anthranilic acid derivatives: Mefenamic acid[s], Diclofenac, Aceclofenac
c) Aryl acetic acid derivatives: Indomethacin, Ibuprofen[s], Piroxicam[s]
d) Aniline and paraaminophenol derivatives: Phenacetin, Acetaminophen[s]
e) Pyrazolone and pyrazolidine dione derivatives: Antipyrin, Oxyphenbutazone, Phenylbutazone.
f) Diaryl sulphonamides: Nimesulide[s], Rofecoxib, Valdecoxib. 6

VIII Prostaglandins and other eicosanoids

A. History and discovery
B. Eicosanoid biosynthesis
C. Drug action mediated by eicosonoids
D. Eicosanoid approved for human clinical use 3

MEDICINAL CHEMISTRY I – PRACTICALS

I Identification test and test for purity of*
1 Acetazolamide
2 Ascorbic acid
3 Aspirin
4 Aminophylline
5 Atropine sulphate
6 Caffeine
7 Paracetamol
8 INH
9 Sulphanilamide

II Assay of medicinally useful compounds (in solid dosage form)**

1 Ibuprofen by alkalimetry
2 Analgin by iodimetry
3 Ephedrine HCl/Phenobarbitone by non-aqueous titration
4 Procaine/Benzocaine by diazotisation
5 Chlorpromazine by cerrimetry

III Preparation of medicinally useful compounds*

1 Phenytoin from benzoin
2 Paracetamol from p-nitrophenol
3 Benzocaine from p-aminobenzoic acid
4 4-hydroxycoumarin from resorcinol

5 Mefenamic acid from anthranilic acid
6 Phenothiazine from diphenylamine

IV 1. Degradation of caffeine*
2. Degradation of ephedrine*

TEXT BOOKS:

1. Text book of Organic Medicinal & Pharmaceutical Chemistry, Wilson and Giswold
2. Medicinal Chemistry by Kadam, Vol I and II
3. Ashutoshkar's, Medicinal Chemistry.
4. Medicinal Chemistry by K. Ilango

REFERENCE BOOKS:

1. Burger's Medicinal Chemistry, Vol I to IV.
2. Medicinal Chemistry, W.A. Foye.
3. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
4. Medicinal and Pharmaceutical Chemistry by Harkishan Singh, V.K.Kapoor by Vallabh Prakashan New Delhi.
5. Vogel's Text Book of Practical Organic Chemistry, ELBS / Longman , London.
6. Practical Organic Chemistry BY Mann and Saunder. Orient Longman, UK.
7. An Introduction to The Chemistry of heterocyclic Compounds by R.M. Acheson Wiley Eastern Ltd. New Delhi.
8. Indian Pharmacopoeia, 1985, 1996 and 2007

15BP303	**PHARMACOLOGY**	L	T	P
		3	1	3
Course objectives	Study the pharmacology of drugs acting on autonomic nervous system, cardiovascular system, urinary & respiratory system. Study of autacoids & its antagonists.			
Course Outcomes	The students will understand the pharmacokinetic and dynamic aspects of drugs and basic knowledge relevant to pharmacotherapeutics.			

PHARMACOLOGY (THEORY) (75 HOURS)

Unit – I

1. General pharmacology **18 Hours**

a. Introduction to pharmacology
b. Source of drugs.
c. Different routes of administration of drugs
d. Pharmacokinetics – Absorption, distribution, metabolism & excretion of drugs and factors affecting them.
e. Pharmacodynamics – Mechanism of action of drug
   i. Drug-receptor interactions
   ii. Molecular basis of drug action
f. Combined effect of drugs – additive effect, synergism, potentiation & antagonism
g. Factors modifying drug effects.
   i. Patient related factors
   ii. Pharmaceutical/Drug related factors
h. Adverse drug reaction.
i. Drug interactions (Definition, classification, concepts and mechanisms).

Unit-II

2. Pharmacology of peripheral nervous system **17 Hours**

a. Neurohumoral transmission (Autonomic and Somatic)
b. Parasympathomimetics (Cholinergic drugs)
   i. Cholinergic transmission, receptors and drugs modifying cholinergic transmission.
   ii. Classification of drugs and pharmacology of cholinergic drugs
c. Parasympatholytics (Anti cholinergic drugs)
d. Ganglionic stimulants and blocking agents.
e. Neuromuscular blocking agents & drugs used in myasthenia gravis

Rema Razdan 22/10/16 (Dr. Rema Razdan)

22/10/16 (Vimal Jobo Samuel)

22/10/16 (Dr. Geetha KM)

Reference Books:

1. Laurence L. Brunton, Bruce A. Chabner, Björn C. Knollmann., Goodman and Gilman's The Pharmacological Basis of Therapeutics, 12th Ed, McGraw-Hill Professional, 2011.
2. Katzung B.G., Masters S.B. and Trevor A.J., Basic and Clinical Pharmacology, 12th Ed, McGraw-Hill, 2011.
3. Craig C.R. and Stitzel R.E., Modern Pharmacology with Clinical Applications, 6th Ed, Lippincott Williams and Wilkins, 2003.
4. Barar F.S.K., Essentials of Pharmacotherapeutics, 5th Revised Ed, S.Chand & Co. Ltd, 2013.
5. DiPiro J, Talbert R.L., Yee G., Matzke G., Wells B. and Posey L.M., Pharmacotherapy: A Pathophysiologic Approach, 9th Ed, McGraw-Hill, 2014.
6. Sharma H.L. and Sharma K.K., Principles of Pharmacology, 2nd Ed, Paras Medical Publisher, 2011.
7. Seth S.D. and Vimlesh Seth., Text Book of Pharmacology, 3rd Ed, Elsevier, 2008.

Pharmacology – I (Practicals) (3Hours/Week)

1. Regulatory perspectives of animal experiments with special reference to CPCSEA, IAEC, 5R's in experimental pharmacology guidelines.
2. Study of laboratory animals and their handling.
3. Study of physiological salt solutions used in experimental pharmacology.
4. Study of laboratory appliances used in experimental pharmacology.
5. Study of use of general anesthetics in lab animals.
6. Study of various routes of administration of drugs & withdrawal of blood in experimental animals.
7. To record the dose response curve of acetylcholine using isolated chick/goat ileum preparation
8. Study of potentiating effects of cholinergic drugs using isolated chick/goat ileum preparation.
9. Study of anticholinergic drugs using isolated chick/goat ileum preparation.
10. Simulated experiment to record the dose response curve of histamine using isolated guinea pig ileum preparation.
11. Study of agonistic effects of histaminergic drugs using suitable animal isolated tissue preparation.
12. Simulated study of antihistaminic drugs using suitable animal isolated tissue preparation.
13. Simulated experiments on effects of drugs on isolated heart of frog.
14. Simulated experiments on effects of various drugs on rabbit's eye.
15. Simulated experiments on effects of drugs on ciliary motility of frog's esophagus.

Rema Razdan 22/10/16 22/10/16 22/10/16

15BP303	**PHARMACOLOGY**	L	T	P
		3	1	3
Course objectives	To study the effect of drugs on nervous system, cardiovascular system, ~~kidney and hemopoietic~~ system.			
Course Outcomes	The students will understand the pharmacokinetic and dynamic aspects of drugs and basic knowledge relevant to pharmacotherapeutics.			

PHARMACOLOGY (THEORY) (75 HOURS)

Unit – I

1. General Pharmacology **18 Hours**

a. Introduction to pharmacology
b. Source of drugs.
c. Different routes of administration of drugs
d. Pharmacokinetics – Absorption, distribution, metabolism & excretion of drugs and factors affecting them.
e. Pharmacodynamics – Mechanism of action of drug
    a. Drug-receptor interactions
    b. Molecular basis of drug action
f. Combined effect of drugs – additive effect, synergism, potentiation & antagonism
g. Factors modifying drug effects.
    i. Patient related factors
    ii. Pharmaceutical/Drug related factors
h. Adverse drug reaction.
i. Drug interactions (Definition, classification, concepts and mechanisms).

Unit-II

2. Pharmacology of Peripheral Nervous System **17 Hours**

a. Neurohumoral transmission (Autonomic and Somatic)
b. Parasympathomimetics (Cholinergic drugs)
    i. Cholinergic transmission, receptors and drugs modifying cholinergic transmission.
    ii. Classification of drugs and pharmacology of cholinergic drugs
c. Parasympatholytics (Anti cholinergic drugs)
d. Ganglionic stimulants and blocking agents.
e. Neuromuscular blocking agents & drugs used in myasthenia gravis

Reference Books:

1. Laurence L. Brunton, Bruce A. Chabner, Björn C. Knollmann., Goodman and Gilman's The Pharmacological Basis of Therapeutics, 12th Ed, McGraw-Hill Professional, 2011.
2. Katzung B.G., Masters S.B. and Trevor A.J., Basic and Clinical Pharmacology, 12th Ed, McGraw-Hill, 2011.
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5. DiPiro J, Talbert R.L., Yee G., Matzke G., Wells B. and Posey L.M., Pharmacotherapy: A Pathophysiologic Approach, 9th Ed, McGraw-Hill, 2014.
6. Satoskar R.S., Bhandarkar S.D. and Ainapure S.S., Pharmacology and Pharmacotherapeutics, 23rd Ed, Popular Prakashan Pvt Ltd, 2013.
7. Sharma H.L. and Sharma K.K., Principles of Pharmacology, 2nd Ed, Paras Medical Publisher, 2011.
8. Seth S.D. and Vimlesh Seth., Text Book of Pharmacology, 3rd Ed, Elsevier, 2008.

Pharmacology – I (Practicals) (3Hours/Week)

1. Study of laboratory animals and their handling.
2. Study of physiological salt solutions used in experimental pharmacology.
3. Study of laboratory appliances used in experimental pharmacology.
4. Study of use of anesthetics in lab animals.
5. Study of various routes of administration of drugs.
6. To record the dose response curve of acetylcholine using isolated guinea pig/chick/rat ileum preparation
7. Study of potentiating effects of cholinergic drugs using isolated guinea pig /chick/rat ileum preparation.
8. Study of anticholinergic drugs using isolated guinea pig /chick/rat ileum preparation.
9. To record the dose response curve of histamine using isolated guinea pig/chick/rat ileum preparation.
10. Study of agonistic effects of histaminergic drugs using isolated guinea pig /chick/rat ileum preparation.
11. Study of antihistaminic drugs using isolated guinea pig /chick/rat ileum preparation.
12. Simulated experiments on effects of drugs on isolated heart of frog.
13. Simulated experiments on effects of drugs on hypodynamic heart of frog.
14. Simulated experiments on effects of various drugs on rabbit's eye.
15. Simulated experiments on effects of drugs on ciliary motility of frog's esophagus.

UNIT-III **10 Hours**

7. **Drugs and Cosmetics Act, 1940 and its rules 1945.**
    a. Detailed study of Schedule L1, N, H, M, Y, P, U, V, X & DMR (OA) Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties
    b. Labelling & Packing of drugs- General labelling requirements and specimen labels for drugs and cosmetics, List of permitted colours. Offences and penalties.
    c. Administration of the act and rules – Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government analysts, Licensing authorities, controlling authorities, Drug Inspectors
    d. Introduction to non-clinical Studies
8. **Medicinal and Toilet Preparation Act –1955**:
    a. Objectives, Definitions, Licensing,
    b. Manufacture In-bond and Outside bond,
    c. Export of alcoholic preparations,
    d. Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations.
    e. Offences and Penalties.

UNIT-IV **10 Hours**

9. **Drugs and magic remedies Act and its rules:**
    a. Objectives, Definitions,
    b. Prohibition of certain advertisements,
    c. Classes of Exempted advertisements,
    d. Offences and Penalties
10. **Prevention of Cruelty to animals Act-1960:**
    a. Objectives, Definitions,
    b. Institutional Animal Ethics Committee,
    c. Breeding and Stocking of Animals, Performance of Experiments, Transfer and acquisition of animals for experiment, Records,
    d. Power to suspend or revoke registration,
    e. Offences and Penalties
11. **National Pharmaceutical Pricing Authority:** Drugs Price Control Order (DPCO)-2013.
    a. Objectives, Definitions,
    b. Sale prices of bulk drugs,
    c. Retail price of formulations,
    d. Retail price and ceiling price of scheduled formulations,
    e. National List of Essential Medicines (NLEM)

UNIT-V **10 Hours**

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

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13. **Medical Termination of pregnancy act**
14. **Right to information Act**
15. **Introduction to Intellectual Property Rights(IPR)**
    a. Trade Mark, Copyright, Trade Secrets
    b. Difference between a patent and generic drug.
    c. The Patent Act,
    d. Special reference to pharmaceuticals-process patent & product patent.
    e. General procedure for obtaining a pharmaceutical patent
16. **New Drug Application, Abbreviated new drug application (ANDA)**
17. **Introduction to regulatory requirements for**
    Medical Devices and diagnostics, Biologicals, Clinical Trials, BA/BE, Pharmacovigilance programme.

(NOTE: All the above topics to be discussed with latest amendments)

Recommended books: (Latest Edition)

1. Forensic Pharmacy by B. Suresh
2. Text book of Forensic Pharmacy by B.M. Mithal
3. Hand book of drug law-by M.L. Mehra
4. A text book of Forensic Pharmacy by N.K. Jain

Reference Books:

1. Drugs and Cosmetics Act/Rules by Govt. of India publications.
2. Medicinal and Toilet preparations act 1955 by Govt. of India publications.
3. Narcotic drugs and psychotropic substances act by Govt. of India publications
4. Drugs and Magic Remedies act by Govt. of India publication
5. Bare Acts of the said laws published by Government. Reference books (Theory)
6. CDSCO guidelines
7. ICMR guidelines

Web references:

1. http://www.ipindia.nic.in/
2. http://www.pci.nic.in
3. http://www.cdsco.nic.in/
4. http://www.rti.gov.in/
5. http://narcoticsindia.nic.in/
6. http://www.mohfw.nic.in/
7. http://www.cdsco.nic.in

22/10/16

22/10/16 22/10/16

15BP302	PHYTOPHARMACOGNOSY	L	T	P
Course objectives	Pharmacognosy was considered as the study of drugs of natural origin has continuously been enriching with multifaceted information considering various aspects of the natural drugs including isolation and standardization techniques, classification, morphology, microscopy, identification, and utilization of drugs of natural origin.			
Course Outcomes	To assimilate the voluminous knowledge of traditional and modern pharmacognosy to which the students invariably obtain sufficient exposure.			

PHYTOPHARMACOGNOSY

UNIT I

1. Isolation and purification of phytoconstituents **10 hours**

a) Different methods of extraction: Choice of suitable solvent, maceration, percolation and supercritical fluid extraction. Processing and drying methods.

b) Preliminary phytochemical screening of various secondary metabolites in plant extracts.

c) Chromatographic methods applied for the isolation and purification of phytoconstituents.

2. Evaluation of crude drugs **4 hours**

Organoleptic, Microscopical, Physical, Chemical, Spectroscopic and Biological methods

UNIT II

3. Biogenesis of Phytopharmaceuticals **12 hours**

Techniques employed in the elucidation of biosynthetic pathways

b) Detailed study of basic metabolic pathways, Shikimic acid pathway and Isoprenoid pathway

c) Biosynthesis of - Tropane, Quinoline, Opium and Indole alkaloids, Anthraquinones and Steroids.

4. **Tannins** **5 hours**

a) Definition, properties, classification, general method of extraction and estimation of tannins.

b) Source, chemical constituents, chemical tests, uses and adulterants of

i) Pale and Black catechu ii) Nutgal iii) Arjuna iv) Myrobalan v) Bahera

UNIT III

5. Glycosides **15 hours**

a) Definition, properties, chemical tests, classification and general method of extraction of glycosides

b) Definition, properties, chemical nature and uses of the following:

i) Cardiac glycosides ii) Anthracene glycosides iii) Saponins glycosides iv) Cyanogenetic glycosides v) Flavonoids vi) Lactones and bitter glycosides vii) Isothiocyanate glycosides viii) Steroidal glycoalkaloids

P. Sivakami 22/10/16
(P. Sivakami Sundari)

(Dr. Raman Dass)

c).Source, diagnostic characters, chemical constituents, uses, adulterants and marketed products of

i) Digitalis ii) Squill iii) Senna iv) Aloes v) Cochineal vi) Ginseng vii) Liquorice viii) Wild Cherry bark ix) Bioflavonoids (Lemon & Orange peel) x) Gingko xi) Milk-thistle xii) Chirata xiii) Dioscorea xiv) Mustard xv) Solanum species

UNIT IV

6. Alkaloids **13 hours**

a) Definition, properties, chemical tests, classification and general method of extraction of alkaloids

b) Source, diagnostic characters, chemical constituents, uses, adulterants and marketed products of

i) Lobelia ii) Tobacco iii) Datura iv) Atropa v) Cinchona vi) Ipecac vii) Opium viii) Rauwolfia ix) Ergot x) Aconite xi) Kurchi xii) Ephedra xiii) Colchicum xiv) Tea xv) Taxus species

7 Natural allergens and photosensitizing agents and fungal toxins. **2 hours**

UNIT V

8. Essential oils **10 hours**

a) Definition, properties, chemical nature, classification and general method of extraction of volatile oils

b) Source, diagnostic characters, chemical constituents, uses and marketed products of:

i) Clove ii) Cinnamon iii) Fennel iv) Caraway v) Eucalyptus vi) Mentha vii) Nutmeg viii) Lemon grass oil

c) Analysis of the following: Clove oil, Cinnamon oil, Eucalyptus oil, Mentha oil and lemon grass oil

9. Carotenoids **2 hours**

a) Definition, properties and classification of carotenoids.

b) Source, chemical nature and uses of α and β-Carotenes, Lycopene, Xanthophyll

10. Marine Pharmacognosy **2 hours**

Novel medicinal agents from marine sources

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PHYTOPHARMACOGNOSY-PRACTICALS

1. **Quantitative Microscopy**
   a) Leaf Constants: Stomatal Number & Stomatal Index
      Vein Islet Number & Vein termination Number
   b) Determination of dimension of starch grains using eye piece micrometer, lycopodium spore method
   c) Determination of length and width of fibre using eye piece micrometer and camera lucida methods.
2. **Study of Morphology of drugs**.
   Strophanthus, Squill, Rhubarb, Cascara, Ginseng, Liquorice, Senna, Digitalis, Rauwolfia, Wild Cherry bark, Nuxvomica, Vinca, Kurchi, Ephedra, Colchicum, Fennel, Cinnamon, Coriander, Eucalyptus, Ginger.
3. **Study of Powder microscopy (including mixture powder microscopy)**
   Senna, Digitalis, Squill, Rhubarb, Cascara, Liquorice, Cinchona, Ipecac, Rauwolfia, Ephedra, Kurchi, Clove, Cinnamon, Fennel, Coriander, Ginger.
4. Determination of Ash Value
5. Determination of Extractive value
6. Determination of Moisture content
7. Production of Volatile oil.
8. Estimation of tannins.

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REFERENCE BOOKS

1. Kokate C.K. Purohit A.P. and Gokhale S.B., Text book of Pharmacognosy, 14th Ed, Nirali Prakashan, Pune, 1996.
2. Kokate C.K. Purohit A.P. and Gokhale S.B., Pharmacognosy, 22nd Ed, Nirali Prakashan, Pune, 2003.
3. Trease G.E and Evans, W.C., Pharmacognosy, 15th Ed, Bailliere Tindall, Eastbourne, U.K., 2002.
4. Wallis T.E., Text book of Pharmacognosy, 5th Ed, J.A., Churchill Limited, London., 1985.
5. Iyengar M.A. and Nayak SGK., Anatomy of crude Drugs, 8th Ed, Manipal Power Press, Manipal., 2001.
6. Kokate C.K., Practical Pharmacognosy, 3rd Ed., Vallabh Prakahan, Delhi, 1991.
7. Iyengar M.A., Study of Crude drugs, Manipal Power Press Manipal., 14th Ed, 2001.
8. Iyengar M.A., Pharmacognosy of powdered crude drugs, Manipal Power Press Manipal., 6th Ed, 2001.
9. Brain, K.R., Turner, T.D., The Practical Evaluation of Phytopharmaceuticals, wright-Scietechnica, Bristol
10. Herbal Pharmacopoeia of India, Government of India, Ministry of Health, Vol I & Vol II. (1998 & 2001), Lavoisier Publishing House, 1995.
11. Jean Bruneton, Pharmacognosy & Phytochemistry, Medicinal Plants , 2nd Ed
12. Wagner H and Bladt S, Plant Drug Analysis, TLC Atlas, 2nd Ed, Springer-verlag 1984.
13. Biren Shah, Seth, A.K., Textbook of Pharmacognosy & Phytochemistry, 2nd Ed., ELSEVIER, A division of Reed Elsevier India Private Limited, 2014.

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15BP306	**PHARMACEUTICAL MANAGEMENT & MARKETING**	L	T	P
		2	1	-
Course objectives	To understand the general management and marketing principles in pharmaceutical marketing, the types of markets, competitive practices in pharmaceutical industries, pharmaceutical product and regulatory requirements.			
Course Outcomes	Upon completion of the course the student shall be able to • Know pharmaceutical market. • Understand various product strategies • Understand the basic principles of management sciences. • Appreciate the importance of marketing in product promotion. • Basic knowledge of regulatory requirements for marketing pharmaceuticals			

PHARMACEUTICAL MARKETING & MANAGEMENT – THEORY

UNIT I **12 HOURS**

1 Marketing

a) Definition and scope of marketing.
b) Distinction between Marketing and Selling.
c) The pharmaceutical market-
   a. Quantitative and qualitative aspects,
   b. Size and composition of the market,
   c. Demographic descriptions and
   d. Socio-psychological characteristics of the consumer,
   e. Market segmentation.
d) Analysing the market- role of market research.
e) Consumer profile-
   a. Motivation and prescribing habits of the physician,
   b. Patients' choice of physician and Retail pharmacist.
f) Emerging Concepts and Trends of Marketing: Vertical and Horizontal Marketing, Rural Marketing, Consumerism, Industrial Marketing, Global Marketing.

2 The Organization

Manufacturer-

a. Company objectives,
b. Influence of internal controls such as company policy on the company's operation,
c. Effects of government regulations and controls on marketing practices.

UNIT II **12 HOURS**

3 The Pharmaceutical Product

a) Market consideration in product development,
   a. Marketing mix, product life cycle(PLC), effects of different elements of marketing mix at different stages of PLC,

(Dr. Raman Dang)

22/10/16
(Mahesh A R)

(Dr. B. Wilson)

b. Product classification,
c. Product planning,
d. Product differentiation,
e. Me- too products,
f. Modification of existing product.

b) New product development-
   a. All stages from the new product idea to the stage of marketing in developed product (Bulk drugs and formulations).

c) Branding-
   a. Concept of brand,
   b. Different types of brand,
   c. Importance and reasons for branding,
   d. Packaging.

4 **Competitive Practices in Pharmaceutical Industries**

a) Price competition-
   a. Pricing,
   b. Objectives,
   c. Basis and strategies.
   d. Rate contracts.

b) Non-price competition:

all types of non-price competition with special emphasis on
   a. Competition through research and development,
   b. Competition through quality.

UNIT III **10 HOURS**

5 **Promotions**

a) Communication and its importance

b) Different ways of promotion-
   Advertising, direct mail, professionals, journals, sampling, retailing, medical exhibition, public relations, Online Promotional Techniques for OTC Products.

c) Professional sales representative-
   a. Duties of PSR,
   b. Purpose of detailing,
   c. Selection and training,
   d. Compensation and future prospects of the PSR.

6 **Distribution**

a) The wholesale-
   a. His role in distribution of pharmaceutical services offered to the manufacturer and the retailer,
   b. Advantages and disadvantages of distribution through wholesaler.

c) The retailer-
   a. Classification of retail institution, advantages and disadvantages of retail institution, the hospital as retail outlet.

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UNIT IV **10 HOURS**

7 **Management**

a) Concepts of management, Nature of management, principles of management.
b) Primary functions of management- planning, organizing, staffing, directing and controlling, motivation, and entrepreneurship development.
c) Secondary functions of management: Decision- making, Leadership, innovation, delegation of authority/ responsibility.

8 **Entrepreneurship**

Meaning, Entrepreneurship: Concept, knowledge and skills requirement; characteristic of successful entrepreneurs; role of entrepreneurship in economic development; entrepreneurship process; factors impacting emergence of entrepreneurship; managerial vs. entrepreneurial approach and emergence of entrepreneurship.

UNIT V **6 HOURS**

9 **Quality Management**

a) Introduction to Statistical Methods,
b) Statistical Quality Control Tools,
c) Statistical Tools for Decision Making,
d) Total Quality Management/Kaizen: Six Sigma,
e) Quality Circle and CPM (Critical Path Method)

10 **Regulatory Authorities and their Guidelines**

ICH, USFDA, TGA, MHRA, WHO, IPC, Worldwide pharmaceutical Regulatory Agencies

Recommended Books:

1. Philip Kotler, Amstrong: Principles of Marketing, Prentice Hall Pvt Ltd.,13th edition
2. Heinz Weihrich, Harold Koontz: Management: A global Perspective, McGraw Hill International Edition, Tenth edition.
3. S.V.R. Subba Rao, Pharmaceutical Marketing in India, Asian Institute of Pharmaceutical Marketing, Hyderabad, 1998 edition.
4. Arun Kumar and N. Meenakshi: Marketing Management, Vikas Publishing, India.
5. Mickey C. Smith, Principles of Pharmaceutical Marketing, CBS publishers and distributors, New Delhi, 3rd edition.
6. C.V.S. Subrahmanyam. Pharmaceutical production and management, Vallabh Prakashan publisher, New Delhi, 2005.
7. Peter F. Drucker, Management-tasks, responsibilities, practices. Allied Publishers Pvt Ltd., Mumbai, 2003.
8. Mickey C. Smith, Pharmaceutical Marketing in the 21st Century, pharmaceutical product press, New York, USA, 1996
9. Sachin Itkar, Pharmaceutical Management, Nirali Prakashan Publishers, Pune, 2007.

Website references:

1. www.ich.org,
2. http://www.fda.gov/,
3. https://www.gov.uk,
4. https://www.tga.gov.au/quality-guidelines

Third Year

3.1 PHARMACOLOGY – II (THEORY)

Theory : 3 Hrs. /Week

1. **Scope of the Subject:** This subject will provide an opportunity for the student to learn about the drug with regard to classification, pharmacodynamic and pharmacokinetic aspects, adverse effects, uses, dose, route of administration, precautions, contraindications and interaction with other drugs. In this subject, drugs acting on autacoids, respiratory system, GIT, immune system and hormones, and pharmacology of autocoids and hormones will be concentrated. In addition, pharmacology of chemotherapeutic agents, vitamines, essential minerals and principles of toxicology are also taught. In addition to theoretical knowledge, the basic practical knowledge relevant to therapeutics will be imparted.

2. **Objectives of the Subject Upon completion of the subject student shall be able to:**
   a. understand the pharmacological aspects of drugs falling under the above mentioned chapters,
   b. carry out the animal experiments confidently,
   c. appreciate the importance of pharmacology subject as a basis of therapeutics, and
   d. correlate and apply the knowledge therapeutically.

Text books (Theory)

a. Tripathi, K. D. Essentials of medical pharmacology. 4th edition, 1999. Publisher: Jaypee, Delhi.
b. Satoskar, R.S. and Bhadarkar, S.D. Pharmacology and pharmacotherapeutics. 16th edition (single volume), 1999. Publisher: Popular, Dubai.
c. Rang, H.P. and Dale, M.M. Pharmacology. 4th edition, 1999. Publisher: Churchill Living stone.

Reference books (Theory)

a. Goodman Gilman, A., Rall, T.W., Nies, A.I.S. and Taylor, P. Goodman and Gilman's The pharmacological Basis of therapeutics. 9th edition, 1996. Publisher: Mc Graw Hill, Pergamon press.
b. Craig, C.R. and Stitzel, R.E. Modern Pharmacology. Latest edition. Publisher: Little Brown and company.
c. Katzung, B.G. Basic and clinical pharmacology. Latest edition. Publisher: Prentice Hall, International.
d. Gupta, P.K. and Salunkhe, D.K. Modern Toxicology. Volume I, II and III. Latest edition. Publisher: B.V. Gupta, Metropolitan Book Co. (p) Ltd, New Delhi.

Text books (Practical)

Kulkarni, S. K. and Dandia, P. C. Hand book of experimental pharmacology. Latest edition, Publisher: Vallab, Delhi.

6. **The dynamic cell: The structures and functions of the components of the cell**
   a) Cell and macromolecules: Cellular classification, subcellular organelles, macromolecules, large macromolecular assemblies
   b) Chromosome structure: Pro and eukaryotic chromosome structures, chromatin structure, genome complexity, the flow of genetic information.
   c) DNA replication: General, bacterial and eukaryotic DNA replication.
   d) The cell cycle: Restriction point, cell cycle regulators and modifiers.
   e) Cell signaling: Communication between cells and their environment, ion-channels, signal transduction pathways (MAP kinase, P38 kinase, JNK, Ras and PI3-kinase pathways, biosensors.

   The Gene: Genome structure and function:
   a) Gene structure: Organization and elucidation of genetic code.
   b) Gene expression: Expression systems (pro and eukaryotic), genetic elements that control gene expression (nucleosomes, histones, acetylation, HDACS, DNA binding protein families.
   c) Transcription and Transcription factors: Basic principles of transcription in pro and eukaryotes. Transcription factors that regulate transcription in pro and eukaryotes.

   RNA processing: rRNA, tRNA and mRNA processing.
   Protein synthesis: Mechanisms of protein synthesis, initiation in eukaryotes, translation control and post-translation events
   Altered gene functions: Mutations, deletions, amplifications, LOH, traslocations, trinucleotide repeats and other genetic abnormalities. Oncogenes and tumor suppressor genes.
   The gene sequencing, mapping and cloning of human disease genes.
   Introduction to gene therapy and targeting.
   Recombinant DNA technology: principles. Processes (gene transfer technology) and applications

Books:

1 Molecular Biology of the Cell by Alberts B., Bray, D., Lewis, J., Raff M., Roberts, K and Watson, JD, 3rd edition.
2 Molecular Cell Biology By Lodish, H., Baltimore, D., Berk, A et al., 5th edition.
3 Molecular Biology by Turner, PC., McLennan, AG., Bates, AD and White MRH 2nd edition.
4 Genes VIII by Lewin, B., (2004)
5 Pharmaceutical Biotechnology, by Crommelin, DJA and Sindelar RD (1997)
6 Recombinant DNA by Watson, JD., Gilman, M., et al., (1996)
7 Biopharmaceutical: Biochemistry and Biotechnology by Walsh, G., (1998)

3.2 PHARMACEUTICAL ANALYSIS (THEORY)

Theory : 3 Hrs. /Week

1. **Quality Assurance:**
   a. Introduction, sources of quality variation, control of quality variation.
   b. Concept of statistical quality control.
   c. Validation methods- quality of equipment, validation of equipment and validation of analytical instruments and calibration.
   d. GLP, ISO 9000.
   e. Total quality management, quality review and documentation.
   f. ICH- international conference for harmonization-guidelines.
   g. Regulatory control.

2. **Chromatography:**
   Introduction, history, classification, separation techniques, choice of methods. The following techniques be discussed with relevant examples of pharmaceutical products involving principles and techniques of separation of drugs from excipients.
   a. **Column Chromatography**: Adsorption column chromatography, Operational technique, frontal analysis and elution analysis. Factors affecting column efficiency, applications and partition chromatography.
   b. **TLC**: Introduction, principle, techniques, R_f value and applications.
   c. **PC:** Introduction, principle, types of paper chromatography, preparation techniques, development techniques, applications.
   d. **Ion-exchange chromatography**: Introduction, principles, types of ion exchange synthetic resins, physical properties, factors affecting ion exchange, methodology and applications.
   e. **HPLC**: Introduction, theory, instrumentation, and applications.
   f. **HPTLC**: Introduction, theory, instrumentation, and applications.
   g. **Gas Chromatography**: Introduction, theory, instrumentation-carrier gases, types of columns, stationary phases in GLC & GSC. Detectors- Flame ionization detectors, electron capture detector, thermal conductivity detector. Typical gas chromatogram, derivatisation techniques, programmed temperature gas chromatography, applications.
   h. **Electrophoresis**: Principles of separation, equipment for paper and gel electrophoresis, and application.
   i. **Gel filtration** and **affinity chromatography**: Introduction, technique, applications.

- **Fluorimetric Analysis:** Theory, luminescence, factors affecting fluorescence, quenching. Instrumentation, Applications, fluorescent indicators, study of pharmaceutically important compounds estimated by fluorimetry.

b. **Flame Photometry:** Theory, nebulisation, flame and flame temperature, interferences, flame spectrometric techniques and instrumentation and pharmaceutical applications.

c. **Atomic Absorption Spectrometry:** Introduction, Theory, types of electrodes, instrumentation and applications.

d. **Atomic Emission Spectroscopy**: Spectroscopic sources, atomic emission spectrometers, photographic and photoelectric detection.

e. **NMR & ESR (introduction only):** Introduction, theoretical aspects and applications.

f. **Mass Spectroscopy**: **(Introduction only)** – Fragmentation, types of ions produced mass spectrum and applications.

g. **Polarimetry: (Introduction only)** – Introduction to optical rotatory dispersion, circular dichroism, polarimeter.

h. **X-RAY Diffraction: (Introduction only)** – Theory, reciprocal lattice concept, diffraction patterns and applications.

i. **Thermal Analysis**: Introduction, instrumentation, applications, and DSC and DTA.

3.2 PHARMACEUTICAL ANALYSIS (PRACTICAL)

Practical : 3 Hrs./Week

List of Experiments:

1. Separation and identification of Amino Acids by Paper Chromatography.
2. Separation and identification of Sulpha drugs by TLC technique.
3. Effect of pH and solvent on the UV spectrum of given compound.
4. Comparison of the UV spectrum of a compound with that of its derivatives.
5. Determination of dissociation constant of indicators using UV-Visible spectroscopy.
6. Conductometric titration of mixture of acids with a strong base.
7. Potentiometric titration of a acid with a strong base.
8. Estimation of drugs by Fluorimetric technique.
9. Study of quenching effect in fluorimetry.
10. Colourimetric estimation of Supha drugs using BMR reagent.

Practicals

Title of the Experiment:

1 Study of agonistic and antagonistic effects of drugs using Guinea-pig ileum preparation.**
2 To study the effects of drugs on intestinal motility using frog's esophagus model*
3 To study the effects of drugs using rat uterus preparation.**
4 To study the anticonvulsant property of drugs (any one model).*
5 To study antihistaminic property of drug using histamine induced anaphylactic reaction in guinea pigs.
6 To study the apomorphine-induced compulsive behaviour (stereotypy) in mice.*
7 To study the muscle relaxant property of diazepam in mice using rotarod apparatus.*
8 To study the antiinflammatory property of indomethacin against carrageenan-induced paw oedema.**
9 To study the anxiolytic effect of diazepam in mice using mirrored-chamber apparatus.**
10 To demonstrate the effect of various drugs on the blood pressure and respiration of anaesthetized dog.
11 To study the effect of anthelmintics on earthworms.
12 To study the taming effect of chlorpromazine.*
13 To study the effects of drugs on vas deferense of the male rat.**
14 To study the effect of drugs on pesticide toxicity using rats as model.
15 To study the effect of drugs on heavy metal toxicity.

** indicate major experiment & * indicate minor experiment

Scheme of Practical Examination:

	Sessionals	**Annual**
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max Marks	**20**	**70**
Duration	**03hrs**	**04hrs**

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

3.3 PHARMACOTHERAPEUTICS – II (THEORY)

Theory : 3 Hrs. /Week

1. **Scope of the Subject:** This course is designed to impart knowledge and skills necessary for contribution to quality use of medicines. Chapters dealt cover briefly pathophysiology and mostly therapeutics of various diseases. This will enable the student to understand the pathophysiology of common diseases and their management.

2. **Objectives of the Subject Upon completion of the subject student shall be able to –**
   a. know the pathophysiology of selected disease states and the rationale for drug therapy
   b. know the therapeutic approach to management of these diseases;
   c. know the controversies in drug therapy;
   d. know the importance of preparation of individualised therapeutic plans based on diagnosis; and
   e. appreciate the needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).

   Text books (Theory)
   Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone publication

   Reference books (Theory)
   a. Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton & Lange
   b. Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication
   c. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA]

3. **Detailed syllabus and lecture wise schedule :**
   Etiopathogenesis and pharmacotherapy of diseases associated with following systems / diseases –

   Title of the topic
   1. **Infectious disease:** Guidelines for the rational use of antibiotics and surgical Prophylaxis, Tuberculosis, Meningitis, Respiratory tract infections, Gastroenteritis, Endocarditis, Septicemia, Urinary tract infections, Protozoal infection- Malaria, HIV & Opportunistic infections, Fungal infections, Viral infections, Gonarrhoea and Syphillis
   2 **Musculoskeletal disorders**
   Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic lupus erythematosus.
   3 **Renal system**
   Acute Renal Failure, Chronic Renal Failure, Renal Dialysis, Drug induced renal disorders

3.4 PHARMACEUTICAL JURISPRUDENCE (THEORY)

Theory : 2 Hrs. /Week

1. **Scope of the Subject:** (4-6 lines): This course exposes the student to several important legislations related to the profession of pharmacy in India. The Drugs and Cosmetics Act, along with its amendments are the core of this course. Other acts, which are covered, include the Pharmacy Act, dangerous drugs, medicinal and toilet preparation Act etc. Besides this the new drug policy, professional ethics, DPCO, patent and design Act will be discussed.

2. **Objectives of the Subject:** Upon completion of the subject student shall be able to (Know, do, and appreciate) –
   a. practice the Professional ethics;
   b. understand the various concepts of the pharmaceutical legislation in India;
   c. know the various parameters in the Drug and Cosmetic Act and rules;
   d. know the Drug policy, DPCO, Patent and design act;
   e. understand the labeling requirements and packaging guidelines for drugs and cosmetics;
   f. be able to understand the concepts of Dangerous Drugs Act, Pharmacy Act and Excise duties Act; and
   g. other laws as prescribed by the Pharmacy Council of India from time to time including International Laws.

   Text books (Theory)

   Mithal , B M. Textbook of Forensic Pharmacy. Calcutta :National; 1988.

   Reference books (Theory)

   a. Singh, KK, editor. Beotra's the Laws of Drugs, Medicines & cosmetics. Allahabad: Law Book House; 1984.
   b. Jain, NK. A Textbook of forensic pharmacy. Delhi: Vallabh prakashan ; 1995.
   c. Reports of the Pharmaceutical enquiry Committee
   d. I.D.M.A., Mumbai. DPCO 1995
   e. Various reports of Amendments.
   f. Deshapande, S.W. The drugs and magic remedies act 1954 and rules 1955. Mumbai: Susmit Publications; 1998.
   g. Eastern Book Company .The narcotic and psychotropic substances act 1985, Lucknow: Eastern; 1987.

3. **Detailed syllabus and lecture wise schedule:**

   Title of the topic

   1. **Pharmaceutical Legislations** – A brief review.
   2. Principle and Significance of professional ethics. Critical study of the code of pharmaceutical ethics drafted by PCI.
   3. **Drugs and Cosmetics Act, 1940,and its rules 1945.**
      Objectives, Legal definition, Study of Schedule's with reference to Schedule B, C&C1, D, E1, F&F1, F2, F3, FF, G, H, J, K, M, N, P, R, V, W, X, Y.
      Sales, Import, labeling and packaging of Drugs And Cosmetics Provisions Relating to Indigenous Systems.
      Constitution and Functions of DTAB,DCC,CDL.
      Qualification and duties –Govt. analyst and Drugs Inspector.

3.5 MEDICINAL CHEMISTRY (PRACTICAL)

Practical : 3 Hrs./Week

1. Assays of important drugs from the course content.
2. Preparation of medicinally important compounds or intermediates required for synthesis of drugs.
3. Monograph analysis of important drugs.
4. Determination of partition coefficients, dissociation constants and molar refractivity of compounds for QSAR analysis.

Reference Books:

a. Wilson and Gisvold's Text book of Organic, Medicinal and Pharmaceutical Chemistry, Lippincott-Raven Publishers-New York, Philadelphia.
b. William.O.Foye, Principles of Medicinal Chemistry, B.I. Waverly Pvt. Ltd., New Delhi.
c. Burgers, Medicinal Chemistry, M.E.,Welly Med.Chemistry M.E. Walffed Johnwilley and Sons, Wiley-interscience Publication, New York, Toranto.
d. A Text Book of Medicinal Chemistry Vol. I and II by Surendra N. Pandeya, S.G. Publisher, 6, Dildayal Nagar, Varanasi -10.
e. Indian Pharmacopoeia 1985 and 1996. The Controller of Publications, Civil Lines, Delhi - 54.
f. Current Index of Medical Specialities (CIMS) and MIMS India, MIMS, A.E. Morgan Publications (I) Pvt. Ltd, New Delhi-19.
g. Organic Drug Synthesis-Ledniser Mitzsher Vol. I and II.
h. Pharmaceutical Chemistry drug Synthesis Vol. I and II by H. J. Roth and A. Kleemann.
i. The Science and Practice of Pharmacy Vol. 1 and 2, Remington, MACK Publishing Company, Easton, Pennsylvania.

3.6 PHARMACEUTICAL FORMULATIONS (THEORY)

Theory : 2 Hrs. /Week

1. **Scope of the Subject:** Scope and objectives of the course: Subject deals with the formulation and evaluation of various pharmaceutical dosage forms.

2. **Objectives of the Subject:** Upon completion of the subject student shall be able to (Know, do, appreciate) –
   a. understand the principle involved in formulation of various pharmaceutical dosage forms;
   b. prepare various pharmaceutical formulation;
   c. perform evaluation of pharmaceutical dosage forms; and
   d. understand and appreciate the concept of bioavailability and bioequivalence, their role in clinical situations.

   Text books (Theory)
   a. Pharmaceutical dosage forms, Vol, I,II and III by lachman
   b. Rowlings Text book of Pharmaceutics
   c. Tutorial Pharmacy – Cooper &Gun

   Reference books (Theory)
   a. Remington's Pharmaceutical Sciences
   b. USP/BP/IP

3. **Detailed syllabus and lecture wise schedule:**

   Title of the topic

   1. Pharmaceutical dosage form- concept and classification
   2. **Tablets**: Formulation of different types of tablets, tablet excipients, granulation techniques quality control and evaluation of tablets. Tablet coating, Type of coating, quality control tests for coated tablet.
   3. **Capsules**; Production and filling of hard gelatin capsules, Raw material for shell, finishing, quality control tests for capsules. Production and filling of soft gelatin capsules, quality control tests for soft gelatin capsules.
   4. **Liquid orals**: Formulation and evaluation of suspensions, emulsions and solutions. Stability of these preparations
   5. **Parenterals** Introduction Containers used for Parenterals (including official tests) Formulation of large and small volume Parenterals Sterilization
   6. **Ophthalmic preparations (Semi – Solids)**: Introduction and classification Factors affecting absorption and anatomy of skin Packaging storage and labeling, Ointments Types of Ointment Base Preparation of ointment, Jellies Types of jellies Formulation of jellies Suppositories, Method of preparation, Types Packaging
   7. Definition and concept of **Controlled and novel Drug delivery systems** with available examples, viz. parentral, trans dermal, buccal, rectal, nasal, implants, ocular

Scheme of III B.Pharm in College of Pharmaceutical Sciences

DAYANANDA SAGAR UNIVERSITY, BANGALORE
SCHEME OF STUDY AND EXAMINATION 2015-16

Sl.No.	Subject Code	Subject	C R/ A U	No. of Hours of Teaching				Scheme of Evaluation	
				Lecture	Tutorial	Practical's	No. of Credits	IA marks	Annual Marks
1	15BP301	Medicinal Chemistry I	CR	3	1	-	3	30	70
2	15BP302	Phytopharmacognosy	CR	3	1	-	3	30	70
3	15BP303	Pharmacology	CR	3	1	-	3	30	70
4	15BP304	Pharmaceutical Engineering	CR	3	1	-	3	30	70
5	15BP305	Pharmaceutical Jurisprudence	CR	2	1	-	2	30	70
6	15BP306	Pharmaceutical Management and Marketing	CR	2	1	--	2	30	70
7	15BP371	Medicinal Chemistry I	CR	-	-	1.5	1.5	30	70
8	15BP372	Phytopharmacognosy	CR	-	-	1.5	1.5	30	70
9	15BP373	Pharmacology	CR	-	-	1.5	1.5	30	70
10	15BP374	Pharmaceutical Engineering	CR	-	-	1.5	1.5	30	70
Grand Total 1000				**16**	**6**	**6**	**22**	**300**	**700**

Continuous evaluation: Self study presentation / survey reports / quiz/ assignments / Laboratory exercises / presentation in seminar & work shops

CR: Credit Subject

III B.PHARM

15BP304	**PHARMACEUTICAL ENGINEERING**	L	T	P
		3	1	3
Course objectives	➢ This course is planned to impart a fundamental knowledge on art and science of various equipments used in pharma industries. ➢ This subject mainly focuses on unit operations, material handling, pharma plant construction, corrosion, industrial pollution and its control.			
Course Outcomes	The prime outcome is to know the operation of various equipments used in pharma industry; also know the corrosion, industrial hazards and its control, layout of pharma industry.			

PHARMACEUTICAL ENGINEERING –THEORY

Unit I

1. **Stoichiometry** 2
   Unit processes, material and energy balances, units and their conversions, dimensional formulae, dimensionless equations.

2. **Heat transfer** 5
   Concept of heat flow by conduction, convection and radiation. Fourier's law and its application, Forced and natural convection, surface co-efficient, study of single, multi pass heat exchangers and liquid-liquid heat interchangers, radiations, black body, Stefan-Boltzmann equation.

3. **Evaporation** 5
   Classification of evaporators, factor affecting evaporation, evaporators–film evaporators, single effect and multiple effect evaporators, forced circulation evaporation, material and energy balance, economy of multiple effect evaporator.

Unit II

4. **Drying** 5
   Theory of drying, Classification and types of dryers - Principle construction and working of tray dryer, fluidized bed dryer, drum dryer, vacuum dryer, freeze dryer, and spray dryer.

5. **Distillation** 5
   Raoult's law, Dalton's law, volatility, Rayleigh's equation, real and ideal solutions, boiling point curves, simple, steam, molecular and flash distillations. Rectification and fractional columns, brief study on principle of azeotropic, molecular and extractive distillation, plant steam, WFI, pure steam.

6. **Size reduction** 6
   Definition, objectives, factors affecting size reduction, laws governing energy and power requirement of a mill, stress strain relationship of deformation in solids. Types

22/10/16 (Ramesh B) (B. Nilson) 22/10/16 22/10/16 (Manjula Talluri)

of mills, construction and working of ball mill, hammer mill, fluid energy mill, cutter mill, edge runner and end runner mill.

Unit III

7. Size separation 4

Definition and objectives of size separation, particle size distribution, standard sieves as per IP. Mechanical sieve shakers, sedimentation tanks, mechanical classifiers, cyclone separators, air separators, bag filter.

8. Mixing 7

Theory of mixing, solid-solid, solid-liquid and liquid-liquid mixing. Equipment-tumbler, V-cone, double cone, ribbon blenders, sigma blade and planetary mixer, zig-zag mixers. Mixing devices: propellers, turbines, paddles, and baffles. Vortex formation and prevention. Homogenization, and study on Silverson, Rapasonic and colloid mills, RMG.

9. Material handling systems 5

Transportation of solids-construction and working of belt conveyor, screw, chain, pneumatic conveyors, pharmaceutical applications.

Unit IV

10. Flow of fluids 6

Pumps- positive displacement pumps, centrifugal pump, peristaltic pump, cycloidal blowers. Reynolds experiment and its significance, Bernoulis Theorem, types of manometers, Energy loses. Flow meters- venturimeter, orifice meter, pitot tube.

11. Filtration and centrifugation 6

Study of Poiseuille's equation, Kozeny - Carmen equation, Darcy's equation and study of filter aids and filter medium. Construction and working of filter press, filter leaf, Meta filter and candle filter. Theory and principle of centrifugation, industrial centrifuges- basket, tubular bowl, conical disk centrifuges. Introduction to types of filters for bioburden reduction and sterilization.

12. Crystallization 5

Definition, characteristics, crystal forms, crystal habits, mechanism of crystallization – super saturation, nucleation, crystal growth, solubility curves, Mier's super-saturation theory, construction and working of agitated batch crystallizer, Swenson Walker crystallizer, Krystal crystallizer and vacuum crystallizers. Caking of crystals and its prevention.

Unit V

13. Humidification and air conditioning 5

Definition of humidity, humid heat, humid volume, study of psychrometric charts, wet bulb theory. Applications of humidity. Theory of airconditioning, Refrigeration

22/10/16 22/10/16 22/10/16

- coefficient of performance. Introduction to Air Handling Unit (AHU) and Heating Ventilation and Airconditioning System (HVAC).

14. Plant location and materials of construction 6

Layout, utilities and services, factors affecting material selection, classification, chemical and mechanical properties of important materials such as steel, plastic, rubber and glass, their uses, advantages and disadvantages (SS types and usages in pharma industry-SS 304, 304L and 316 and 316L.

15. Corrosion 2

Definition, types, theories, prevention and control of corrosion.

16. Introduction to process automation 1

Requirement of Good Automated Manufacturing Practice (GAMP).

PHARMACEUTICAL ENGINEERING -PRACTICAL

1. Drying of wet granules and to plot rate of drying curves.**
2. Operation of Ball mill and to calculate Rittinger's and Kick's co-efficient.**
3. Operation of sieve shaker and sieve analysis and deriving various statistical parameters.**
4. Determination of mixing efficiency when the propeller blade is introduced in different positions during liquid-liquid mixing. **
5. Determination of mixing index of blenders for a solid mixture using salicylic acid.*
6. Factors effecting rate of filtration on i) surface area ii) viscosity iii) concentration iv) thickness v) filter aids.**
7. Determination of water vapor permeability across the packing material.*
8. Experiment to determine the leaching of contents from packing material: Ampoules and Vials.**
9. Evaluation of pharmaceutical packing materials – corrugated box.*
10. Preparation of crystals of Potassium nitrate by shock cooling technique and study of its crystal habit. *
11. Measurement of humidity using psychrometric charts (Demonstration).
12. Evaporation: factors affecting the rate of evaporation.**
    i) Surface area.
    ii) Concentration.
    iii) Viscosity.

**** Major experiments**
*** Minor experiments**

22/10/16 22/10/16 22/10/16

TEXT BOOKS:

1. Carter SJ. Cooper and Gunn's Tutorial Pharmacy. 6th ed. New Delhi: CBS Publishers; 2000.
2. Walter L Badger , Julius T Banchero. Introduction to Chemical Engineering. 3rd ed. New York: McGraw Hill publication; 1955.
3. Rawlins EA. Bentley's Textbook of Pharmaceutics. 8th ed. New Delhi: All India Traveller Book Seller; 2002.
4. Paradkar AR. Introduction to Pharmaceutical Engineering. 6th ed. Pune: Nirali Prakashan; 2004.
5. Sambamurthy K. Pharmaceutical Engineering. ed. New Delhi: CBS publishers; 1998.
6. Subramanyam CVS, Timma Shetty J. Pharmaceutical Engineering Principles and Practices. 1st ed. New Delhi: Vallabh Prakashan; 2002.

REFERENCE BOOKS

1. Max Peter. Elementary Chemical Engineering. 2nd ed. McGraw Hill international Book Company; 1984.
2. Don. WG, James. OM. Perry's Chemical Engineers Handbook. 6th ed. McGraw Hill Book Company; 1984.
3. Coulson JM, Richardson JF. Chemical Engineering. 2nd ed. ELBS Pergemom Press; 1977.
4. Alfonso R Gennaro. Remington: The Science and Practice of Pharmacy, 20th ed. Vol I and II, Philadelphia, USA: Lippincott Williams and Wikkins; 2000.
5. Indian Pharmacopoeia 2010
6. www.ispe.org.
7. www.who.int.

22/10/16 22/10/16 22/10/16

15BP305	PHARMACEUTICAL JURISPRUDENCE	L	T	P
		2	1	-
Course objectives	To understand the legal and ethical aspects of drugs. The course exposes the student to several important legislations to the profession of pharmacy in India			
Course Outcomes	Upon completion of the course, student will be able to understand the significance and relevance of pharmaceutical laws in India and role of ethics in Pharmacy profession. The student will be able to understand the significance of various schedules of D & C Act. The student will possesses the knowledge about Patents & IPR.			

PHARMACEUTICAL JURISPRUDENCE – THEORY

UNIT-I **10 Hours**

1. **Introduction to Pharmaceutical Jurisprudence**
   a. Definitions of Rules, Acts, & Guidelines
   b. Introduction to National and International drug regulatory law like D & C Act, US FDA, EMA, TGA
2. **Pharmaceutical Legislations** –
   a. Brief Introduction,
   b. Study of drugs enquiry committee,
   c. Health survey and development committee,
   d. Hathi committee and Mudaliar committee
3. **Code of Pharmaceutical ethics:**
   a. Definition,
   b. Pharmacist in relation to his job, trade, medical profession and his profession,
   c. Pharmacist's oath
4. **Pharmacy Act –1948**:
   a. Objectives, Definitions,
   b. Pharmacy Council of India; its constitution and functions,
   c. Education Regulations,
   d. State and Joint state pharmacy councils; its constitution and functions,
   e. Registration of Pharmacists,
   f. Offences and Penalties

UNIT-II **10 Hours**

5. **DGHS- CDSCO & State drug control,** structure role and responsibilities.
6. **Drugs and Cosmetics Act, 1940 and its rules 1945:**
   a. Objectives, Definitions, Legal definitions of schedules to the act and rules
   b. Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties.
   c. Manufacture of drugs – Prohibition of manufacture and sale of certain drugs,
   d. 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.
   e. Introduction of export of Drugs.

22/10/16 (Mahesh AR) 22/10/16 (Umesh B) B.A.T.S. CA. Wilson 22/10/16 (Manjula Talluri)

DAYANANDA SAGAR UNIVERSITY, BENGALURU

College of Pharmaceutical Sciences

Revised List of BOS Members for the academic year 2017-18

Sl.No	Name	Address	Email ID	Contact no.
1	Dr. Rajasekharan	Professor, Dept. of Chemistry, KMCH, Coimbatore, T.N	rajasekaranpharm@gmail.com	9840132004
2	Dr. Rema Razdan	Prof., Dept. of Ph'cology, Al-Amen College of Pharmacy, Bengaluru	rrazdan2002@yahoo.com	9886034280
3	Dr. Manjula Talluri	Prof., Dept. of Ph'ceutics, PES College of Pharmacy ,Bengaluru	manjulatalluri@yahoo.com	9901114249
4	Dr. Raman Dang	Principal, Krupanidhi College of Pharmacy,Bengaluru	dangraman2000@yahoo.co.in	9945846106
5	Sri. Umesh	Industry Expert	umeshbaikunje@icloud.com	9663309323/ 9916412448
6	Dr. V.Murugan	Dean –Pharmacy	murugan_9362@yahoo.com	9343824404
7	Dr. S.R.Brahmani Priyadarshini	Professor- Pharmaceutics	priya.srb@gmail.com	9739856416
8	Dr. K.M.Geetha	Professor & HOD Pharmacology	geethakm@yahoo.com	9900508674
9	Dr. B.Wilson	Professor & HOD Pharmaceutics	antrilparavai@gmail.com	9482962475
10	Dr. N.B.Sridhara Murthy	Professor & HOD Pharmacy Practice	murthy.sridhara@yahoo.com	9945303867
11	Mrs. Kalpana Divekar	Associate Professor –Pharma chemistry	divekarkalpana@yahoo.com	9845227554
12	Mrs. M.S.Sandhyavali	Associate Professor –Pharma chemistry	mssandhyavali06@rediffmail.com	9845545542

DEAN
College of Pharmaceutical Sciences
Dayananda Sagar University
Kumaraswamy Layout,
Bengaluru - 560 078.

COLLEGE OF PHARMACEUTICAL SCIENCES, DSU

List of members attended UG BOS meeting on 22/10/16 at College of Pharmaceutical sciences, DSU for the academic year 2017-18

Sl.No	Name	Designation	Signature
1	Dr. V Murugan	Chairman	
2	Dr. Raman Dang	Member	
3	Dr. Rema Razdan	Member	
4	Dr. Rajasekharan	Member	
5.	Dr. Manjula Talluri	Member	
6	Mr. Umesh Baikunje	Member	
7	Dr. Wilson B	Member	
8	Dr. Geetha KM	Member	
9	Dr. Sridharamurthy	Member	
10	Mrs. Kalpana Divekar	Member	
11	Mrs. Sandhyavali MS	Member	
12	Dr. Sivakami Sundari	Member	
13	Mr. Vimal John Samuel	Member	
14	Dr. Manjula.D	Member	
15	Mrs. Rekha. M	Member	
16	Mr. Mahesh. AR	Member	
17	Ms. Annu	Member	

DEAN
College of Pharmaceutical Sciences
Dayananda Sagar University
Kumaraswamy Layout,
Bengaluru - 560 078.

COLLEGE OF PHARMACEUTICAL SCIENCES
DAYANANDA SAGAR UNIVERSITY
Minutes of the BOS meeting

The BOS meeting for the college of pharmaceutical sciences, DSU for the academic year 2017-18 was conducted on 4th march 2017 for discussing minor revision in the syllabus of 3rd year B. Pharma which was framed during the previous BOS meeting held on 22nd October 2016 for the academic year 2017-18 and to discuss make-up examination as well as award of grace marks in the final examination.

The meeting started at 11 am at DSU board room with Dean, Dr. V. Murugan welcoming all BOS members. Dr. S. Rajasekaran, Professor from Al-Ameen College of Pharmacy was the external expert member at the meeting. Deliberations were made on the minor changes in the subject Pharmaceutical Engineering.

After a detailed discussion, the following resolutions were made

1. Few subtopics in introduction in the Pharmaceutical Engineering subject was deleted. The deleted topics are
   a. Distillation - Plant Steam, WFI, Pure steam
   b. Mixing - RMG
   c. Flow of Fluids Pumps - positive displacement pumps, Centrifugal pumps, Peristaltic pump, Cycloidal blowers, types of manometers, energy loses
   d. Humidification and Airconditioning - Introduction to Air Handling Unit (AHU) and Heating Ventilation and Airconditioning System (HVAC)
   e. Plant location and materials of construction - Plant Layout, utilities and services, SS types and usages in Pharma Industry – SS 304, 304 L and 316 and 316 L
   f. Introduction to process automation – full topic

2. A makeup examination is allowed in respective subjects for the students who fails to clear the final examinations. The make-up examination will be conducted after a gap of minimum one month after the announcement of final examination results. This is to avoid loss of one full academic year for the students who have failed in the annual exammination.
3. A system of awarding grace marks to the maximum of three marks was accepted provided the student should clear all the subjects for the respective exam. This will help the students who fails in one or two subjects by a margin of one or two marks.

4. It was decided unanimously that, the improvement sessionals will be allowed only for semester scheme students as per PCI norms from the academic year 2017-18.

5. Regarding M.Pharm syllabus, it was decided to break the syllabus unit-wise.

The meeting concluded with vote of thanks by Mrs. M.S.Sandhyavali.

Sl. No.	Name	Signature
1	Dr. V.Murugan	
2	Dr. A.Rajasekaran	
3	Dr. Prabhakar	
4	Dr. S.Bharath	
5	Dr. S.Rajasekaran	
6	Dr. R.Nandeesh	
7	Dr. B.Wilson	
8	Dr. Kalpana Divekar	
9	Dr. K.M.Geetha	
10	Mrs. M.S.Sandhyavali	
11	Dr. Sivakami Sundari.P	
12	Mrs. K.B.Premakumari	

Dayananda Sagar University

COLLEGE OF PHARMACEUTICAL SCIENCES, DSU

List of members attended UG BOS meeting on 04/03/2017 at College of Pharmaceutical Sciences, DSU for the academic year 2017-18

Sl.No.	Name	Designation	Signature
1.	Dr. V Murugan	Chairman	
2.	Dr. S. Rajasekharan	Member	
3.	Dr. Wilson B	Member	
4.	Dr. Geetha K M	Member	
5.	Dr. Sridharamurthy	Member	
6.	Dr. Brahmani Priyadarshini	Member	
7.	Mrs. Sandhyavali M S	Member	
8.	Dr. Manjula D	Member	
9.	Mrs. Rekha M S	Member	
10.	Ms. Annu P	Member	

Dayananda Sagar University
College of Pharmaceutical Sciences,Bengaluru

Date: 06/01/2018

MINUTES OF THE MEETING

Fourth BOS Meeting of Dayananda Sagar University for IV Year B. Pharm (annual scheme) started on 06/01/2018 at 10.30 am at College of Pharmaceutical Sciences, DSU. Dr.V.Murugan, Dean DSU welcomed the BOS members. This was followed by introduction of BOS members .

Agenda:

1. Proposing IV B.Pharm syllabus for the academic year 2018-19 for consideration and approval. (Subjects: Medicinal Chemistry, Industrial Pharmacognosy, Ph'Analysis, Ph'Technology, Pharmacology & Advanced Industrial Pharmacy)
2. Conduct of I semester university exam for M.Pharm - Ph'Analysis .
3. To discuss on continuous evaluation marks to increase to 50.
4. To conduct improvement examination as per PCI norms.
5. To introduce units in the existing PCI - M.Pharm syllabus.
6. Any other matter with the permission of the chairman.

1. After preliminary discussions the members were split into department wise and the subjects in their respective departments were discussed in detail along with Faculty in-charge. Suggestions given by the experts were incorporated after deliberations.

Restructuring of the proposed syllabus for IV B.Pharm course under DSU was finalized after scrutiny by expert members. The final copy was signed by the subject experts (Internal and External).

2. Regarding the conduct of I semester University exam for M.Pharm practicals, all the board members were of the opinion that, the exam should be scheduled for 2 days i.e., one day for Modern Pharmaceutical Analytical techniques and 2nd day for Core subject with separate examiners for Analysis and core subject. The marks distribution being 35 for Analysis and 65 for core subject.

Dayananda Sagar University
College of Pharmaceutical Sciences, Bengaluru

Date: 07/03/2019

MINUTES OF BOS MEETING

Fifth BOS Meeting of College of Pharmaceutical Sciences, Dayananda Sagar University for B.Pharm - I & II semester was held on 07/03/2019 for the academic year 2019-20 from 10.00 am to 1.00 pm at Dean's office. Dr. V.Murugan, Dean, COPS, DSU welcomed the BOS members to discuss the following agenda:

1. Students are allowed to take backlog subjects examinations in the next consecutive semester examinations. Students will be eligible for 5th semester after passing of all subjects of I & II semester and so on as per PCI norms.
2. For the better understanding of the subject, the BOS after long deliberation revised the following subjects of II semester. The revised syllabus is attached as Annexure.
   a. Pharmaceutical Organic Chemistry I (17BP202)
   b. Biochemistry (17BP203)
3. There were no changes in the subjects of Pharmaceutics Department for the I semester.
4. For better understanding of the subject, experiment numbers 5, 6, 7 &10 of II semester was shifted to I semester Human Anatomy & Physiology I (17BP107) and experiment numbers 6, 7, 8 & 13 were shifted to II semester Human Anatomy & Physiology II (17BP207) in Practicals syllabus prescribed by PCI.
5. Due to no admission for the M.Pharm – Pharmaceutical Chemistry branch for the past four years, it was recommended to close the course and to increase intake in M.Pharm – Pharmaceutics and Pharmacology branches from 06 seats to 10 seats.

The meeting was concluded with vote of thanks by Dr. Kalpana Divekar, Assoc. Prof., COPS, DSU.

SEMESTER /YEAR : II SEM
TITLE : PHARMACEUTICAL ORGANIC CHEMISTRY –I (Theory)
COURSE CODE: 17BP202
45 Hours

Scope: This subject deals with classification and nomenclature of simple organic Compounds, structural isomerism, intermediates forming in reactions, important physical Properties, reactions and methods of preparation of these compounds. The syllabus also emphasizes on mechanisms and orientation of reactions.

Objectives: Upon completion of the course the student shall be able to
1. Write the structure, name and the type of isomerism of the organic compound
2. Write the reaction, name the reaction and orientation of reactions
3. Account for reactivity/stability of compounds,
4. Identify/confirm the identification of organic compound

Course Content:
General methods of preparation and reactions of compounds superscripted with asterisk (*) to be explained
To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences

UNIT-I **10 Hours**

• Introduction, Classification, IUPAC Nomenclature,Isomerism.
Different types of bonds, Intermolecular forces, proteic and aproteic solvents,Reaction intermediates ,attacking reagents. Classification of Organic Compounds.
IUPAC systems of nomenclature of organic compounds for alkanes,alkenes,alkynes,cycloalkanes,alcohols,aldehydes,ketones,acids,amines
Ethers,Esters ,polyfunctional compounds.
Structural isomerism in organic compounds.

UNIT-II **7 Hours**

• Alkanes*, Alkenes* and Conjugated dienes*
SP^3 hybridization in alkanes, Halogenation of alkanes, stability of alkenes
SP^2 hybridization in alkenes.

E_1 and E_2 reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation. E_1 verses E_2 reactions,
Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, Anti Markownikoff's orientation. Diel-Alder reaction.

Conjugated Dienes,1,2 and 1,4 addition reaction in conjugated dienes.

UNIT-III **10 Hours**

• **Alkyl halides***

SN_1 and SN_2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations.

SN_1 versus SN_2 reactions, Factors affecting SN_1 and SN_2 reactions

Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform.

• **Alcohols***- Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol

UNIT-IV **10 Hours**

• **Carbonyl compounds* (Aldehydes and ketones)**

Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.

UNIT-V **08 Hours**

• **Carboxylic acids***

Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids ,amide and ester

Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid. Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid

• **Aliphatic amines*** - Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine

PHARMACEUTICAL ORGANIC CHEMISTRY -I (Practical), Course code 17BP 208

4 Hours / week

1. Systematic qualitative analysis of unknown organic compounds like

1. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.
2. Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne's test
3. Solubility test
4. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.
5. Melting point/Boiling point of organic compounds
7. confirmation of the unknown Compound by melting point/ boiling point.
8. Minimum 4 unknown organic compounds to be analyzed systematically.

2. Preparation of pharmaceutically important compounds .(Any four)
3. Construction of molecular models

Recommended Books (Latest Editions)

1. Organic Chemistry byMorrison and Boyd
2. Organic Chemistry by I.L. Finar , Volume-I
3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
4. Organic Chemistry by P.L.Soni
5. Practical Organic Chemistry byMann and Saunders.
6. Vogel's text book of Practical Organic Chemistry
7. Advanced Practical organic chemistry by N.K.Vishnoi.
8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.
9. Reaction and reaction mechanism by Ahluwaliah/Chatwal.

SEMESTER/YEAR : II SEM
COURSE CODE : 17BP203
TITLE OF THE COURSE : BIOCHEMISTRY - THEORY
L: T/A: P: C : 3 : 1 : 0 : 4
45 Hours

Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

COURSE OBJECTIVES: Upon completion of course student shell able to

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

2. Understand the metabolism of nutrient molecules in physiological and pathological

conditions.

3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.

UNIT I 08 Hours

Biomolecules

Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins.

Bioenergetics

Energy rich compounds; classification; biological significances of ATP and cyclic AMP

UNIT II 10 Hours

Carbohydrate metabolism

Glycolysis – Pathway, energetics and significance
Citric acid cycle- Pathway, energetics and significance
HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency
Glycogen metabolism Pathways and glycogen storage diseases (GSD) Gluconeogenesis- Pathway and its significance
Hormonal regulation of blood glucose level and Diabetes mellitus

Biological oxidation

Electron transport chain (ETC) and its mechanism
Oxidative phosphorylation & its mechanism and substrate level phophorylation
Inhibitors ETC and oxidative phosphorylation / Uncouplers

UNIT III 10 Hours

Lipid metabolism

β-Oxidation of saturated fatty acid (Palmitic acid)

Formation and utilization of ketone bodies; ketoacidosis

De novo synthesis of fatty acids (Palmitic acid)

Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D

Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity.

Amino acid metabolism

General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders

Defination

(Phenyketonuria, Albinism, alkeptonuria, tyrosinemia)

Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline

hyperbilirubinemia and jaundice

UNIT IV 10 Hours

Nucleic acid metabolism and genetic information transfer

Catabolism of purine nucleotides and Hyperuricemia and Gout disease

Organization of mammalian genome

Structure of DNA and RNA and their functions DNA replication (semi conservative model)

Transcription or RNA synthesis

Genetic code, Translation or Protein synthesis and inhibitors

UNIT V 07 Hours

Enzymes

Introduction, properties, nomenclature and IUB classification of enzymes

Enzyme kinetics (Michaelis plot, Line Weaver Burke plot)

Enzyme inhibitors with examples

Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation

Therapeutic and diagnostic applications of enzymes and isoenzymes

Coenzymes (NAD FAD COQ) –Structure and biochemical functions

SEMESTER/YEAR : II SEM
COURSE CODE : 17BP209
TITLE OF THE COURSE : BIOCHEMISTRY - PRACTICAL
L: T/A: P: C : 0 : 0 : 4 : 2

1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch)
2. Identification tests for Proteins (albumin and Casein)
3. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method)
4. Qualitative analysis of urine for abnormal constituents
5. Determination of blood creatinine
6. Determination of blood sugar
7. Determination of serum total cholesterol
8. Preparation of buffer solution and measurement of pH
9. Study of enzymatic hydrolysis of starch

RECOMMENDED BOOKS (LATEST EDITIONS):

1. Principles of Biochemistry by Lehninger.
2. Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
3. Biochemistry by Stryer.
4. Biochemistry by D. Satyanarayan and U.Chakrapani
5. Textbook of Biochemistry by Rama Rao.
6. Textbook of Biochemistry by Deb.
7. Outlines of Biochemistry by Conn and Stumpf
8. Practical Biochemistry by R.C. Gupta and S. Bhargavan.
9. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition)
10. Practical Biochemistry for Medical students by Rajagopal and Ramakrishna.
11. Practical Biochemistry by Harold Varley.

SEMESTER/YEAR : I SEM
COURSE CODE : 17BP101
TITLE OF THE COURSE : HUMAN ANATOMY AND PHYSIOLOGY I – THEORY
L: T/A: P: C : 3 : 1 : 0 : 4

COURSE OBJECTIVES: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

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

(i) Explain the gross morphology, structure and functions of various organs of the human body.

(ii) Describe the various homeostatic mechanisms and their imbalances.

(iii) Identify the various tissues and organs of different systems of human body.
(iv) Perform the various experiments related to special senses and nervous system.
(v) Appreciate coordinated working pattern of different organs of each system

45 Hours

UNIT I **10 Hours**

Introduction to human body

Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology.

Cellular level of organization

Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine

Tissue level of organization

Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.

UNIT II **10 Hours**

Integumentary system
Structure and functions of skin

Skeletal system

Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system.Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction

Joints Structural and functional classification, types of joints movements and its articulation

UNIT III 10 Hours

- **Body fluids and blood**

Body fluids, composition and functions of blood, hemopoeisis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.

- **Lymphatic system**

  Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system

UNIT IV **08 Hours**

Peripheral nervous system:

Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system.
Origin and functions of spinal and cranial nerves.

Special senses Structure and functions of eye, ear, nose and tongue and their disorders.

UNIT V **07 Hours**

Cardiovascular system

Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.

QUESTION PAPER PATTERN
FOR THEORY END SEMESTER EXAMINATIONS

(i) Objective Type Questions (Answer all questions)	: 10x2=20
(ii) Long Answers Questions (Answer 2 out of 3)	: 2x10=20
(iii) Short Answers Questions (Answer 7 out of 9)	: 7x5=35
Total end semester examination	: 75 Marks
Continuous mode	: 25 Marks
Total	: 100 Marks

SEMESTER/YEAR	**: I SEM**
COURSE CODE	**: 17BP107**
TITLE OF THE COURSE	**: HUMAN ANATOMY AND PHYSIOLOGY I – PRACTICAL**
L: T/A: P: C	**: 0 : 0 : 4 : 2**

Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.

1. Study of compound microscope.
2. To demonstrate positive and negative feedback mechanism.
3. Microscopic study of epithelial and connective tissue
4. Microscopic study of muscular and nervous tissue
5. Identification of axial bones

6. Identification of appendicular bones
7. Determination of blood group
8. Determination of bleeding time
9. Determination of clotting time
10. Estimation of hemoglobin content

11. Study of cardiovascular systems with the help of models, charts and specimens
12. Determination of heart rate and pulse rate.
13. Recording of blood pressure.
14. To study the integumentary and special senses using specimen, models, etc.,
15. To study the integumentary and special senses using specimen, models, etc.,
16. To examine the different types of taste.

17. To demonstrate the visual acuity

RECOMMENDED BOOKS (LATEST EDITIONS):

1) Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.

2) Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York

3) Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview,MI USA

4) Text book of Medical Physiology- Arthur C, Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.

5) Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

6) Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.

7) Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.

8) Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

REFERENCE BOOKS (LATEST EDITIONS):

1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA

2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.

3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje, Academic Publishers Kolkata

QUESTION PAPER PATTERN

FOR PRACTICAL END SEMESTER EXAMINATIONS (SEE)

(i) Synopsis	= 05 Marks
(ii) Experiments	= 25 Marks
(iii) Viva Voce	= 05 Marks

Total end semester examination	: 35 Marks
Continuous mode	: 15 Marks
Total	: 50 Marks

Dayananda Sagar University
College of Pharmaceutical Sciences, Bengaluru

Date: 07/03/2019

MINUTES OF BOS MEETING

Fifth BOS Meeting of College of Pharmaceutical Sciences, Dayananda Sagar University for B.Pharm - I & II semester was held on 07/03/2019 for the academic year 2019-20 from 10.00 am to 1.00 pm at Dean's office. Dr. V.Murugan, Dean, COPS, DSU welcomed the BOS members to discuss the following agenda:

1. Students are allowed to take backlog subjects examinations in the next consecutive semester examinations. Students will be eligible for 5th semester after passing of all subjects of I & II semester and so on as per PCI norms.
2. For the better understanding of the subject, the BOS after long deliberation revised the following subjects of II semester. The revised syllabus is attached as Annexure.
   a. Pharmaceutical Organic Chemistry I (17BP202)
   b. Biochemistry (17BP203)
3. There were no changes in the subjects of Pharmaceutics Department for the I semester.
4. For better understanding of the subject, experiment numbers 5, 6, 7 &10 of II semester was shifted to I semester Human Anatomy & Physiology I (17BP107) and experiment numbers 6, 7, 8 & 13 were shifted to II semester Human Anatomy & Physiology II (17BP207) in Practicals syllabus prescribed by PCI.
5. Due to no admission for the M.Pharm – Pharmaceutical Chemistry branch for the past four years, it was recommended to close the course and to increase intake in M.Pharm – Pharmaceutics and Pharmacology branches from 06 seats to 10 seats.

The meeting was concluded with vote of thanks by Dr. Kalpana Divekar, Assoc. Prof., COPS, DSU.

Proceedings of the BOS meeting of COPS, DSU held on 03/03/2020

The meeting of the board of studies was held in Dean's office, College of Pharmaceutical Sciences, DSU on 3rd March 2020 from 10.00AM to 1.00 PM.

The BOS Chairman Dr. V. Murugan welcomed all the members of the board and introduced the members to the newly joined faculty member and commenced the meeting.

The agenda of the meeting was

1) Reviewing B. Pharm- 7th & 8th semester syllabus.
2) Regarding selection of elective subjects and project work in B. Pharm – 8th Semester.
3) Any other matter.

The syllabus of 7th & 8th semester of B. Pharm. for the academic year 2020-21 was reviewed elaborately and the following were the decisions taken by the board members.

1) It was decided to follow the syllabus for B. Pharm 7th & 8th Semester as prescribed by PCI, New Delhi.
2) Students will be given the option of selecting two elective subjects of 8th semester from the subjects prescribed by PCI, New Delhi.
3) It was decided to have group projects comprising a maximum of 5 students in a project. The project work of the student should be related to choice of one of the elective subjects as per PCI norms.
4) **Dietary Supplements and Nutraceuticals code (17BP812)** missed out in our DSU printed scheme and syllabus of B.Pharm – 8th semester was added.
5) The elective subjects assigned to the respective departments are as follows:
   a. 17BP803, 17BP809 - Dept. of Pharmaceutics
   b. 17BP804, 17BP805 - Dept. of Pharmacy Practice
   c. 17BP806, 17BP812 - Dept. of Pharmacognosy
   d. 17BP808, 17BP810 - Dept. of Pharmacology
   e. 17BP807, 17BP811 - Dept. of Pharmaceutical Chemistry

The meeting was concluded with the vote of thanks by the Member Dr. B.Wilson

DAYANANDA SAGAR UNIVERSITY

SCHOOL OF HEALTH SCIENCES

COLLEGE OF PHARMACEUTICAL SCIENCES

DOCUMENT TITLE: 6th Board of Studies Meeting of COPS, DSU
DATE: 03.03.2020
TIME: 10.00 – 1.00 PM
VENUE: Dean's Cabin, COPS, DSU

Members Present

No.	Name of the Members	Designation	Signature
1	Dr. V. Murugan	Chairman	
2	Dr. Raju Koneri	External Member	
3	Dr. J. Saravanan	External Member	
4	Dr. R. Nandeesh	External Member	
5	Dr. Narmada.G.Y	External Member	G.Y. Narmada 03/03/2020
6	Dr. Srinivasan R	External Member	03/03/2020
7	Dr. Geetha.K.M	Internal Member	
8	Dr. B. Wilson	Internal Member	
9	Dr. Sivakami Sundari P	Internal Member	
10	Dr. K.V. Ramanth	Internal Member	
11	Dr. Kalpana Divekar	Internal Member	

DEAN
College of Pharmaceutical Sciences
Dayananda Sagar Univ...

DAYANANDA SAGAR UNIVERSITY

COLLEGE OF PHARMACEUTICAL SCIENCES

7th BOS MINUTES OF MEETING

Venue: Board Room, 6th Floor, Dental Block, DSU Campus 1, Kumaraswamy Layout, Bengaluru -560078	**Date :** 29th March 2021
	Time: 10.00 am to 1.00 pm

Members Present

1	Dr. Pushpa Sarkar	Dean, SAHS, DSU
2	Dr. V. Murugan	Principal, COPS, DSU
3	Mr. Jayaprakash Narayanan	Consultant Pharmaceutical Manufacturing companies, Tamilnadu
4	Dr. Chaluvaraju.K.C	Asst. Prof, Govt. College of Pharmacy, Bengaluru
5	Dr. Prasad Shivarudraiah	Head, Pre-clinical research dept. Anthem Biosciences Pvt. Ltd., Bengaluru
6	Dr. S.Bharath	Dean, MSRUAS, Bengaluru
7	Dr. Kalpana Divekar	Prof, Ph'Chemistry Dept, COPS, DSU
8	Dr. Geetha K.M	Prof & Head, Pharmacology Dept, COPS, DSU
9	Dr. B. Wilson	Prof & Head, Pharmaceutics Dept, COPS, DSU
10	Dr. K.V.Ramanath	Prof & Head, Ph'Practice Dept, COPS, DSU
11	Dr. Sivakami Sundari P	Asst. Prof, Phcognosy Dept, COPS, DSU

Members Absent

1	Dr. Vellaian Karuppiah	Global Head, Strides Pharma Science Pvt. Ltd, Bengaluru
2	Dr. K. Ilango	Prof, SRM College of Pharmacy, Tamilnadu
3	Dr. C. Saravana Babu	Assoc. Prof, JSS College of Pharmacy, Mysuru
4	Dr. Padma M Paarakh	Principal, Oxford College of Pharmacy, Bengaluru
5	Dr. Rohidas Arote	Prof, Ph'Chemistry Dept, COPS, DSU

Minutes of Meeting

Dr. Pushpa Sarkar, Dean, School of Allied and Health Sciences, DSU gave the opening remarks for the proceedings of the 7th BOS meeting of COPS, DSU

The BOS Chairman Dr. V. Murugan welcomed all the members of the board and commenced the meeting.

The agenda of the meeting was

1. As per PCI circular ref no. 14-260/2014-pci/4486 dated 30/09/2020 to include one elective subject for LSSSDC for B.Pharm – VIII sem.
2. Selection of optional subjects by students of VIII sem.
3. Selection of area of specialization for practice school in VII sem
4. Discussion about value added courses in the following branches:

a. Drug targeting strategies
b. Pharmacological screening
c. Handling of Analytical Instruments
d. Polyherbal formulations

5. Any other matter

1. As per the PCI circular ref. no. 14-260/2014-pci/4486 dated 30/09/2020 an elective subject PHARMACEUTICAL PRODUCT DEVELOPMENT is introduced along with the other elective subjects already prescribed for B.Pharm - VIII semester students. The students may choose either 2 elective subjects already listed or can choose one subject from the prescribed list along with one more subject listed in skill pack / modules (LSSSDC) which is available from time to time. This was approved by the members of BOS.
2. Choice of subjects has to be given in the VIII sem. An orientation of the subjects can be given in VII sem for the benefit of students to make a suitable choice of the elective subject. Any five subjects, one from each department can be given as optional subjects and students can choose any two subjects from the five subjects given in the prescribed list. This holds good for the next batch of VIII semester students subjected to the situation where offline classes will be held. The above was approved by the BOS members.
3. The value added courses can be introduced to the students of higher semesters (IV semester onwards). Apart from the list of courses provided (Refer agenda)

two more value added courses as mentioned below were suggested by the BOS members.

a. Modern approaches to green chemistry

b. Fermentation technology

4. Paid publications as a requirement for thesis submission for Ph.D research scholars can be considered for the batches from 2015-2020 as per the notification issued by the University in 2016. The new rule of unpaid publications being mandatory for the consideration of Ph.D thesis of research scholars can hold good from the date of amended notification and cannot be applied retrospectively for students of earlier batches prior to the notification.

LIST OF BOS MEMBERS

No.	Name of the Members	Designation	Signature
1	Dr. Pushpa Sarkar	Dean, SAHS, DSU	
2	Dr. V. Murugan	Chairman	V. Murugan
3	Dr. Vellaian Karuppiah	External Member	- ABSENT -
4	Mr. Jayaprakash Narayanan	External Member	J. Jayaprakash
5	Dr. Prasad Shivarudraiah	External Member	
6	Dr. Chaluvaraju. K.C	External Member	
7	Dr. K. Ilango	External Member	- ABSENT -
8	Dr. S. Bharath	External Member	
9	Dr. C. Saravana Babu	External Member	- ABSENT -
10	Dr. Padma M Paarakh	External Member	- ABSENT -
11	Dr. Kalpana Divekar	Internal Member	
12	Dr. Geetha.K.M	Internal Member	
13	Dr. B. Wilson	Internal Member	
14	Dr. Rohidas Arote	Internal Member	ABSENT
15	Dr. Sivakami Sundari P	Internal Member	
16	Dr. K.V. Ramanth	Internal Member	