



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

1.3

Curriculum Enrichment



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NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

1.3.1

Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum



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Consolidated report



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NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.


Criterion 1 – Curricular Aspects

1.3. Curriculum Enrichment

1.3.1. Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum

CONSOLIDATED REPORT

S.No	CONTENT
1.	Professional Ethics, Gender, Human Values, Environment and Sustainability in the Curriculum
2.	Supported syllabus in the programs
3.	List of activities related to the Professional Ethics, Gender, Human Values, Environment and Sustainability (2017-2022)


Principal
Santhiram College of Pharmacy
NH-40, NANDYAL



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Professional Ethics, Gender, Human Values, Environment and Sustainability in the Curriculum

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NH - 40, Nandyal, Kurnool District, Andhra Pradesh - 518501.

1.3. Curriculum Enrichment

1.3.1. Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment, and Sustainability in the Curriculum

Gender Issues:

The institution sensitizes young all students on crosscutting issues of Human Values and Professional Ethics, Gender, Environment, and Sustainability. The Institution's NSS Units organize various programs to sensitize the inmates and as well as outsiders.

Human Values and Professional Ethics:

A committee is formed to make students to understand the importance of adhering to moral values and professional ethics in life. The curriculum incorporates courses like Dispensing Pharmacy & Ethics, Pharmaceutical Jurisprudence, Medicinal Biochemistry, Community Pharmacy, Pathophysiology, Pharmaco-therapeutics, I, II and III, Hospital Pharmacy, Clinical Pharmacy, Clinical Research, Pharmaco-epidemiology and Pharmaco-economics, Therapeutic Drug Monitoring which explain the legislations and working procedures related to human health. Further, courses like Screening Techniques discuss information about regulatory guidelines for carrying out experiments on animals. Communication Skills Course gives insights into the role of a Pharmacist in society. Oath of Pharmacist and Code of Conduct focus to nurture student discipline, work ethics, and social responsibility. Community service activities are organized by the institution where students are made participatory in health camps to create health awareness among rural men and women.

Gender Equity:

Courses in UG and PG programs like Human Anatomy & Physiology, Pathophysiology, Community Pharmacy, Pharmaco-therapeutics-I, II and III Clinical Pharmacy, and Hospital Pharmacy address various gender issues. Male and Female Reproductive Systems, Oral Contraceptive Methods for men and women, Prescribing Guidelines for pregnant and lactating women, Menstrual Hygiene, Breast Cancer, Endocrine Disorders, Sexual Disorders, and Sports Physiology are some of the Units in the curriculum which provide a comprehensive understanding of the gender-related health issues. Pharma Inspire and other expos were organized to encourage students to present models. To empower the young women physically and emotionally, classes on self-defense, yoga, and sports were incorporated. Women's Day Celebrations and other women empowerment programs aim at transforming their personalities. Women's Grievance and Redressal Cell records the complaints, if any, and solves them.

Environment and Sustainability:

Environmental Education and Awareness is responsible for the environmental promotional activities. The campus is a *No- Plastic Zone* and the greenery and various medicinal plants in the campus speaks of a balanced eco-system. In order to educate and sensitize the students about environmental and sustainability issues, the college organizes Seminars, various Guest lectures, Workshops, Awareness programs, National and International Conferences. The institution makes a consistent effort toward enriching the curriculum by integrating various cross-cutting issues.

Sponsored by : Sri Shirdi Sai Educational Academy, 25/602-A, Srinivasa Nagar, Nandyal - 518501.

Pharmacy the



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SANTHIRAM COLLEGE OF PHARMACY

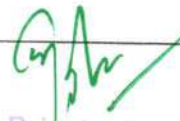
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ISO 9001: 2015 Certified Institution

NH-40, Nerawada, Nandyal, Kurnool DIST. A.P - 518501

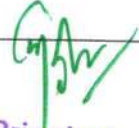
Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum

S.No	Subject Name	Subject Code	Year & Course	Category
1	Human Anatomy and Physiology	P.D. 1.1	I/VI Pharm.D	Gender relevant issues and Health Determinant
2	Medicinal Biochemistry	P.D. 1.3	I/VI Pharm.D	Health Determinant
3	Pathophysiology	P.D. 2.1	II/VI Pharm.D	Emerging Demographic issues
4	Community Pharmacy	P.D. 2.5	II/VI Pharm.D	Gender relevant issues, Right to health and Emerging Demographic issues
5	Pharmacotherapeutics I, II & III	P.D 2.6, 3.3 & 4.1	II, III & IV/ VI Pharm.D	Professional Ethics and Human Values
6	Pharmaceutical Jurisprudence	P.D.3.4	II/VI Pharm.D	Professional Ethics
7	Hospital Pharmacy	P.D. 4.2	II/VI Pharm.D	Professional Ethics

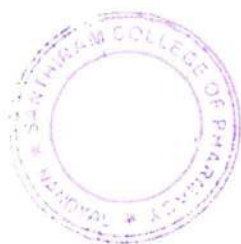

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8	Clinical Pharmacy	P.D. 4.3	II/VI Pharm.D	Health Determinant and Right to health
9	Biostatistics and Research Methodology	P.D. 4.4	II/VI Pharm.D	Emerging Demographic issues and Professional Ethics
10	Clinical Research	P.D. 5.1	V/VI Pharm.D	Professional Ethics and Human Values
11	Pharmacoepidemiology and Pharmacoeconomics	P.D. 5.2	V/VI Pharm.D	Emerging Demographic issues and Professional Ethics
12	Clinical Pharmacokinetics and Therapeutic Drug Monitoring	P.D. 5.2	V/VI Pharm.D	Health Determinant
13	Communication Skills	BP105T & BP111P	I/IV B.Pharmacy (I Sem)	Professional Ethics
14	Human Anatomy and Physiology – II	BP201T & BP207P	I/IV B.Pharmacy (II Sem)	Gender relevant issues and Health Determinant
15	Biochemistry	BP203T & BP209P	I/IV B.Pharmacy (II Sem)	Health Determinant
16	Pathophysiology	BP204T	I/IV B.Pharmacy (II Sem)	Emerging Demographic issues and Gender relevant issues
17	Environmental Sciences	BP206T	I/IV B.Pharmacy (II Sem)	Environment and Sustainability
18	Universal Human Values	19A52301	II/IV B.Pharmacy (III Sem)	Professional Ethics and Human Values
19	Pharmaceutical Jurisprudence	BP505T	III/IV B.Pharmacy (V Sem)	Professional Ethics
21	Biostatistics and Research Methodology	BP801T	IV/IV B.Pharmacy (VII Sem)	Emerging Demographic issues and Professional Ethics




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22	Social and Preventive Pharmacy	BP802T	IV/IV B.Pharmacy (VII Sem)	Health Determinant and Right to health
23	Pharmacovigilance	BP805T	IV/IV B.Pharmacy (VII Sem)	Professional Ethics
24	Dietary Supplements and Neutraceuticals	BP812ET	IV/IV B.Pharmacy (VII Sem)	Health Determinant
25	Disaster Management	21DAC101b	I/II M.Pharmacy (I Sem)	Environment and Sustainability
26	Sanskrit for Technical Knowledge	21DAC101c	I/II M.Pharmacy (I Sem)	Human Values
27	Pedagogy Studies	21DAC201a	I/II M.Pharmacy (II Sem)	Professional Ethics
28	Stress Management from Yoga	21DAC201b	I/II M.Pharmacy (II Sem)	Health Determinant and Right to health
29	Personality Development through Life Enlightenment Skills	21DAC201c	I/II M.Pharmacy (II Sem)	Human Values
30	Biostatistics	21SOE301b	I/II M.Pharmacy (III Sem)	Emerging Demographic issues and Professional Ethics




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1.3.1

Supported syllabus in the programs

**ACADEMIC REGULATIONS COURSE
STRUCTURE AND DETAILED SYLLABI**

PHARM D

AND

PHARM D(*POSTBACCALAUREATE*)

PHARM D. (REGULAR SIX YEAR COURSE)

AND

**PHARM D. (*POST BACCALAUREATE*) (REGULAR THREE
YEAR COURSE)**

**(APPLICABLE FOR THE BATCHES ADMITED
FROM 2017-18)**

COURSE STRUCTURE

First Year:

S.No.	Subjects Codes	Name of Subject	No. of hours of Theory	No. of hours of Tutorial	No. of hours of Practical	Lab	S.No.	Subjects codes
(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)
1.1	17T00101	Human Anatomy and Physiology	3	1	3		1.7	17T00107
1.2	17T00102	Pharmaceutics	2	1	3		1.8	17T00108
1.3	17T00103	Medicinal Biochemistry	3	1	3		1.9	17T00109
1.4	17T00104	Pharmaceutical Organic Chemistry	3	1	3		2.0	17T00110
1.5	17T00105	Pharmaceutical Inorganic Chemistry	2	1	3		2.1	17T00111
1.6	17T00106	Remedial Mathematics/ Biology	3	1	3*		2.2	17T00112*
		Total hours	16	6 = (40)	18			

* For Biology



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Second Year:

S.No	Subjects Codes	Name of Subject	No. of hours of Theory	No. of hours of Tutorial	No. of hours of Practical	Lab	S.No	Subjects Codes
(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)
2.1	17T00201	Pathophysiology	3	1	-	-		-
2.2	17T00202	Pharmaceutical Microbiology	3	1	3	✓	2.7	17T00207
2.3	17T00203	Pharmacognosy &Phytopharmaceuticals	3	1	3	✓	2.8	17T00208
2.4	17T00204	Pharmacology-I	3	1	-	-		-
2.5	17T00205	Community Pharmacy	2	1	-	-		-
2.6	17T00206	Pharmacotherapeutics-I	3	1	3	✓	2.9	17T00209
		Total Hours	17	6 = 32	9			

Third Year:

S.N O	Subjects Codes	Name of Subject	No. of hours of Theory	No. of hours of Tutorial	No. of hours of Practical	Lab	S.No	Subjects Codes
(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)
3.1	17T00301	Pharmacology-II	3	1	3	✓	3.7	17T00307
3.2	17T00302	Pharmaceutical Analysis	3	1	3	✓	3.8	17T00308
3.3	17T00303	Pharmacotherapeutics-II	3	1	3	✓	3.9	17T00309
3.4	17T00304	Pharmaceutical Jurisprudence	2	-	-	-		-
3.5	17T00305	Medicinal Chemistry	3	1	3	✓	4.0	17T00310
3.6	17T00306	Pharmaceutical Formulations	2	1	3	✓	4.1	17T00311
		Total hours	16	5 = 36	15			




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Fourth Year:

S.No.	Subjects Codes	Name of Subject	No. of hours of Theory	No. of hours of Tutorial	No. of hours of Practical/Hospital Posting	Lab	S.No	Subjects Codes
(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)
4.1	17T00401	Pharmacotherapeutics-III	3	1	3	✓	4.7	17T00407
4.2	17T00402	Hospital Pharmacy	2	1	3	✓	4.8	17T00408
4.3	17T00403	Clinical Pharmacy	3	1	3	✓	4.9	17T00409
4.4	17T00404	Biostatistics & Research Methodology	2	1	-	-		-
4.5	17T00405	Biopharmaceutics & Pharmacokinetics	3	1	3	✓	4.10	17T00410
4.6	17T00406	Clinical Toxicology	2	1	-	-		-
		Total hours	15	6 = 33	12			

For Pharm D Post Baccalaurate

4.11	17T00411	Pharmacotherapeutics I & II	3	1	3	✓	4.12	17T00412
			18	7=39				


Fifth Year:

S.No.	Subjects Codes	Name of Subject	No. of hours of Theory	No. of hours of	No. of hours of Hospital posting*
(1)	(2)	(3)	(4)	(5)	(6)
5.1	17T00501	Clinical Research	3	1	-
5.2	17T00502	Pharmacoeconomics and Pharmacoepidemiology	3	1	-
5.3	17T00503	Clinical Pharmacokinetics & Pharmacotherapeutic Drug Monitoring	2	1	-
5.4		Clerkship*	-	1	-
5.5		Project work (Six Months)	-	-	20
		Total hours	8	4 = 32	20

* Attending ward rounds on daily basis.

Note: The entire class work be spread for the entire Academic Year along with Project work and clerkship




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(17T00101) HUMAN ANATOMY & PHYSIOLOGY (THEORY)

Theory:3 Hrs. /Week

1. **Scope and Objectives:** This course is designed to impart a fundamental knowledge on the structure and functions of the human body. It also helps in understanding both homeostasis mechanisms and homeostatic imbalances of various body systems. Since a medicament, which is produced by pharmacist, is used to correct the deviations in human body, it enhances the understanding of how the drugs act on the various body systems in correcting the disease state of the organs.
2. **Upon completion of the course the student shall be able to:**
 - a. describe the structure (gross and histology) and functions of various organs of the human body;
 - b. describe the various homeostatic mechanisms and the imbalances of various systems;
 - c. identify the various tissues and organs of the different systems of the human body;
 - d. perform the hematological tests and also record blood pressure, heart rate, pulse and Respiratory volumes;
 - e. appreciate coordinated working pattern of different organs of each system; and
 - f. appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body

3. Course materials:

Text books

- a. Tortora Gerard J. and Nicholas, P. Principles of anatomy and physiology Publisher Harpercollins college New York.
- b. Wilson, K.J.W. Ross and Wilson's foundations of anatomy and physiology. Publisher: Churchill Livingstone, Edinburg.

Reference books


- a. Guytonarthur, C. Physiology of human body. Publisher: Holtsaunders.
- b. Chatterjee,C.C. Human physiology. Volume 1&11. Publisher: medical allied agency, Calcutta.
- c. Peter L. Williams, Roger Warwick, Mary Dyson and Lawrence, H.
- d. Gray's anatomy. Publisher: Churchill Livingstone, London.

4. Lecture wise program :

Topics

- 1
 - i) Scope of anatomy and physiology, basic terminologies used in this subject (Description of the body as such planes and terminologies)
 - ii) Structure of cell – its components and their functions.
Elementary tissues of the human body: epithelial, connective, Muscular and nervous tissues-their sub-types and characteristics
 - i) Osseous system - structure, composition and functions of the Skeleton. (done in practical classes - 6hrs)
 - iii) Classification of joints, Types of movements of joints and disorders of joints (Definitions only)
- 2 i) Haemopoetic System
 - a) Composition and functions of blood
 - b) Haemopoesis and disorders of blood components (definition of disorder)




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- c) Blood groups
- d) Clotting factors and mechanism
- e) Platelets and disorders of coagulation

ii) Lymph

- a) Lymph and lymphatic system, composition, formation and circulation.
- b) Spleen: structure and functions, Disorders
- c) Disorders of lymphatic system (definition only)

iii) Cardiovascular system

- a) Anatomy and functions of heart
- b) Blood vessels and circulation (Pulmonary, coronary and systemic circulation)
- c) Electrocardiogram (ECG)
- d) Cardiac cycle and heart sounds
- e) Blood pressure – its maintenance and regulation
- f) Definition of the following disorders
Hypertension, Hypotension, Arteriosclerosis, Atherosclerosis, Angina, Myocardial infarction, Congestive heart failure, Cardiac arrhythmias

3 i) Respiratory system

- a) Anatomy of respiratory organs and functions
- b) Mechanism / physiology of respiration and regulation of respiration
- c) Transport of respiratory gases
- d) Respiratory volumes and capacities, and Definition of: Hypoxia, Asphyxia, Dybarism, Oxygen therapy and resuscitation.

ii) Digestive system

- a) Anatomy and physiology of GIT
- b) Anatomy and functions of accessory glands of GIT
- c) Digestion and absorption
- d) Disorders of GIT (definitions only)

iii) Nervous system

- a) Definition and classification of nervous system
- b) Anatomy, physiology and functional areas of cerebrum
- c) Anatomy and physiology of cerebellum
- d) Anatomy and physiology of mid brain
- e) Thalamus, hypothalamus and Basal Ganglia
- f) Spinal cord: Structure & reflexes – mono-poly-planter
- g) Cranial nerves – names and functions
- h) ANS – Anatomy & functions of sympathetic & parasympathetic N.S.

4 i) Urinary system

- a) Anatomy and physiology of urinary system
- b) Formation of urine
- c) Renin Angiotensin system – Juxtaglomerular apparatus - acid base Balance
- d) Clearance tests and micturition


ii) Endocrine system

- a) Pituitary gland
- b) Adrenal gland
- c) Thyroid and Parathyroid glands
- d) Pancreas and gonads

iii) Reproductive system

- a) Male and female reproductive system
- b) Their hormones – Physiology of menstruation
- c) Spermatogenesis & Oogenesis




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- d) Sex determination (genetic basis)
- e) Pregnancy and maintenance and parturition
- f) Contraceptive devices

5 i) Sense organs

- a) Eye
- b) Ear
- c) Skin
- d) Tongue & Nose

ii) Skeletal muscles

- a) Histology
- b) Physiology of Muscle contraction
- c) Physiological properties of skeletal muscle and their disorders (definitions)

iii) Sports physiology

- a) Muscles in exercise, Effect of athletic training on muscles and muscle performance,
- b) Respiration in exercise, CVS in exercise, Body heat in exercise, Body fluids and salts in exercise,
- c) Drugs and athletics



A handwritten signature in green ink, appearing to be "Anil Kumar".

Head of Department
SANTHARA COLLEGE OF PHARMACY
MANTHALA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

Pharm. D - I YEAR

(17T00107) HUMAN ANATOMY & PHYSIOLOGY (PRACTICAL)

Practical : 3 Hrs./Week

General Requirements: Dissection box, Laboratory Napkin, muslin cloth, record, Observation book(100pages), Stationary items, Blood lancet.

Course materials:

Text books

Goyal, R. K, Natvar M.P, and Shah S.A, Practical anatomy, physiology and biochemistry, latest edition, Publisher: B.S Shah Prakashan, Ahmedabad.


Reference books

Ranade VG, Text book of practical physiology, Latest edition, Publisher: PVG, Pune Anderson Experimental Physiology, Latest edition, Publisher: NA

List of Experiments:

1. Study of tissues of human body
 - (a) Epithelial tissue.
 - (b) Muscular tissue.
2. Study of tissues of human body
 - (a) Connective tissue.
 - (b) Nervous tissue.
3. Study of appliances used in hematological experiments.
4. Determination of W.B.C. count of blood.
5. Determination of R.B.C. count of blood.
6. Determination of differential count of blood.
7. Determination of
 - (a) Erythrocyte Sedimentation Rate.
 - (b) Hemoglobin content of Blood.
 - (c) Bleeding time & Clotting time.
8. Determination of
 - (a) Blood Pressure.
 - (b) Blood group.
9. Study of various systems with the help of charts, models & specimens
 - (a) Skeleton system part I-axial skeleton.
 - (b) Skeleton system part II- appendicular skeleton.
 - (c) Cardiovascular system.
 - (d) Respiratory system.
 - (e) Digestive system.
 - (f) Urinary system.
 - (g) Nervous system.
 - (h) Special senses.
 - (i) Reproductive system.




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10. Study of different family planning appliances.
11. To perform pregnancy diagnosis test.
12. Study of appliances used in experimental physiology.
13. To record simple muscle curve using gastrocnemius sciatic nerve preparation.
14. To record simple summation curve using gastrocnemius sciatic nerve preparation.
15. To record simple effect of temperature using gastrocnemius sciatic nerve preparation.
16. To record simple effect of load & after load using gastrocnemius sciatic nerve preparation.
17. To record simple fatigue curve using gastrocnemius sciatic nerve preparation.

Scheme of Practical Examination:

	Sessionals	Annual
Identification	04	10
Synopsis	04	10
Major Experiment	07	20
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).




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(17T00103) MEDICINAL BIOCHEMISTRY (THEORY)

Theory: 3 Hrs. /Week

- 1. Scope of the Subject:** Applied biochemistry deals with complete understanding of the molecular level of the chemical process associated with living cells. Clinical chemistry deals with the study of chemical aspects of human life in health and illness and the application of chemical laboratory methods to diagnosis, control of treatment, and prevention of diseases
- 2. Objectives of the Subject (Know, do, appreciate) :**
The objective of the present course is providing biochemical facts and the principles to the students of pharmacy. Upon completion of the subject student shall be able to –
 - a. understand the catalytic activity of enzymes and importance of isoenzymes in diagnosis of diseases;
 - b. know the metabolic process of biomolecules in health and illness (metabolic disorders);
 - c. understand the genetic organization of mammalian genome; protein synthesis; replication; mutation and repair mechanism;
 - d. know the biochemical principles of organ function tests of kidney, liver and endocrine gland; and
 - e. do the qualitative analysis and determination of biomolecules in the body fluids.

Text books (Theory)

- a. Harpers review of biochemistry - Martin
- b. Text book of biochemistry – D.Satyanarayana
- c. Text book of clinical chemistry- Alex kaplan&LaverveL.Szabo

Reference books (Theory)

- a. Principles of biochemistry -- Lehninger
- b. Text book of biochemistry -- Ramarao
- c. Practical Biochemistry-David T.Plummer.
- d. Practical Biochemistry-Pattabhiraman.

3. Lecture wise programme:

Topics

- 1. a. Introduction to biochemistry:** Cell and its biochemical organization, transport process across the cell membranes. Energy rich compounds; ATP, Cyclic AMP and their biological significance.
- b. Enzymes:** Definition; Nomenclature; IUB classification; Factor affecting enzyme activity; Enzyme action; enzyme inhibition. Isoenzymes and their therapeutic and diagnostic applications; Coenzymes and their biochemical role and deficiency diseases.
- 2. i) Carbohydrate metabolism:** Glycolysis, Citric acid cycle (TCA cycle), HMP shunt, Glycogenolysis, gluconogenesis, glycogenesis. Metabolic disorders of carbohydrate metabolism (diabetes mellitus and glycogen storage diseases); Glucose, Galactose tolerance test and their significance; hormonal regulation of carbohydrate metabolism.
- ii) Lipid metabolism:** Oxidation of saturated (β -oxidation); Ketogenesis and ketolysis; biosynthesis of fatty acids, lipids; metabolism of cholesterol; Hormonal regulation of lipid

metabolism. Defective metabolism of lipids (Atherosclerosis, fatty liver, hypercholesterolemia).

3. i) **Biological oxidation:** Coenzyme system involved in Biological oxidation. Electron transport chain (its mechanism in energy capture; regulation and inhibition); Uncouplers of ETC; Oxidative phosphorylation;

iii) **Protein and amino acid metabolism:** protein turn over; nitrogen balance; Catabolism of Amino acids (Transamination, deamination & decarboxylation). Urea cycle and its metabolic disorders; production of bile pigments; hyperbilirubinemia, porphoria, jaundice. Metabolic disorder of Amino acids.

iv) **Nucleic acid metabolism:** Metabolism of purine and pyrimidine nucleotides; Protein synthesis; Genetic code; inhibition of protein synthesis; mutation and repair mechanism; DNA replication (semiconservative / onion peel models) and DNA repair mechanism.

4. **Introduction to clinical chemistry:** Cell; composition; malfunction; Roll of the clinical chemistry laboratory.

The kidney function tests: Role of kidney; Laboratory tests for normal function includes-

- a) Urine analysis (macroscopic and physical examination, quantitative and semiquantitative tests.)
- b) Test for NPN constituents. (Creatinine /urea clearance, determination of blood and urine creatinine, urea and uric acid)
- c) Urine concentration test
- d) Urinary tract calculi. (stones)

Liver function tests: Physiological role of liver, metabolic, storage, excretory, protective, circulatory functions and function in blood coagulation.

- a) Test for hepatic dysfunction-Bile pigments metabolism.
 - b) Test for hepatic function test- Serum bilirubin, urine bilirubin, and urine urobilinogen.
 - c) Dye tests of excretory function.
 - d) Tests based upon abnormalities of serum proteins.
- Selected enzyme tests.


5. i) **Lipid profile tests:** Lipoproteins, composition, functions. Determination of serum lipids, total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides.

ii) **Immunochemical techniques** for determination of hormone levels and protein levels in serum for endocrine diseases and infectious diseases.

Radio immuno assay (RIA) and Enzyme Linked Immuno Sorbent Assay (ELISA)

iii) **Electrolytes:** Body water, compartments, water balance, and electrolyte distribution. Determination of sodium, calcium potassium, chlorides, bicarbonates in the body fluids.




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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
Pharm. D - I YEAR

(17T00109) MEDICINAL BIOCHEMISTRY (PRACTICAL)

Practical: 3 Hrs. /Week

Title of the Experiment:

1. Qualitative analysis of normal constituents of urine.*
 2. Qualitative analysis of abnormal constituents of urine.*
 3. Quantitative estimation of urine sugar by Benedict's reagent method.**
 4. Quantitative estimation of urine chlorides by Volhard's method.**
 5. Quantitative estimation of urine creatinine by Jaffe's method.**
 6. Quantitative estimation of urine calcium by precipitation method.**
 7. Quantitative estimation of serum cholesterol by LibermannBurchard's method.**
 8. Preparation of Folin Wu filtrate from blood.*
 9. Quantitative estimation of blood creatinine.**
 10. Quantitative estimation of blood sugar Folin- Wu tube method.**
 11. Estimation of SGOT in serum.**
 12. Estimation of SGPT in serum.**
 13. Estimation of Urea in Serum.**
 14. Estimation of Proteins in Serum.**
 15. Determination of serum bilirubin**
 16. Determination of Glucose by means of Glucoseoxidase.**
 17. Enzymatic hydrolysis of Glycogen/Starch by Amylases.**
 18. Study of factors affecting Enzyme activity. (pH& Temp.)**
 19. Preparation of standard buffer solutions and its pH measurements (any two)*
 20. Experiment on lipid profile tests**
 21. Determination of sodium,calcium and potassium in serum.**
- ** indicate major experiments & * indicate minor experiments

Assignments:

Format of the assignment

1. Minimum & Maximum number of pages.
2. It shall be computer draft copy.
3. Reference(s) shall be included at the end.
4. Name and signature of the student.
5. Assignment can be a combined presentation at the end of the academic year.
6. Time allocated for presentation may be 8+2 Min.

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).




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(17T00201) PATHOPHYSIOLOGY (THEORY)

Theory: 3 Hrs. /Week

1. **Scope of the Subject:** This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic Pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge of its application in other subject of pharmacy.
2. **Objectives of the Subject :** Upon completion of the subject student shall be able to –
 - a. describe the etiology and pathogenesis of the selected disease states;
 - b.name the signs and symptoms of the diseases; and
 - c.mention the complications of the diseases.

Text books (Theory)

- a.Pathologic basis of disease by- Cotran, Kumar, Robbins
- b.Text book of Pathology- Harsh Mohan
- c.Text book of Pathology- Y.M. Bhide

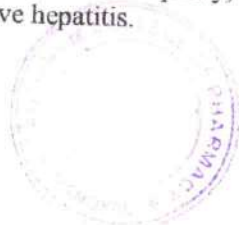
Reference books (Theory)


- a. Clinical Pharmacy and Therapeutics; Second edition; Roger Walker; Churchill Livingstone publication

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

Chapter

- 1
 - i) **Basic principles of cell injury and Adaptation**
 - a) Causes, Pathogenesis and morphology of cell injury
 - b) Abnormalities in lipoproteinaemia, glycogen infiltration and glycogen infiltration and glycogen infiltration and glycogen storage diseases
 - ii) **Inflammation**
 - a) Pathogenesis of acute inflammation, Chemical mediators in inflammation, Types of chronic inflammation
 - b) Repairs of wounds in the skin, factors influencing healing of wounds
- 2 **i) Diseases of Immunity**
 - a) Introduction to Tand B cells
 - b) MHC proteins or transplantation antigens
 - c) Immune tolerance
 - Hypersensitivity
Hypersensitivity type I, II, III, IV, Biological significance, Allergy due to food, chemicals and drugs
 - Autoimmunity
Criteria for autoimmunity, Classifications of autoimmune diseases in man, mechanism of autoimmunity, Transplantation and immunologic tolerance, allograft rejections, transplantation antigens, mechanism of rejection of allograft.
-Acquired immune deficiency syndrome (AIDS)
- Amyloidosis
- ii) Infectious diseases :
Sexually transmitted diseases (HIV, Syphilis, Gonorrhoea), Urinary tract infections, Pneumonia, Typhoid, Tuberculosis, Leprosy, Malaria Dysentery (bacterial and amoebic), Hepatitis- infective hepatitis.




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- 3 **Cancer:** differences between benign and malignant tumours, Histological diagnosis of malignancy, invasions and metastasis, patterns of spread, disturbances of growth of cells, classification of tumours, general biology of tumours, spread of malignant tumours, etiology and pathogenesis of cancer.
- 4 a) Types of shock, mechanisms, stages and management
 b) Biological effects of radiation
 c) Environmental and nutritional diseases
 i) Air pollution and smoking- SO₂, NO, NO₂, and CO
 ii) Protein calorie malnutrition, vitamins, obesity, pathogenesis of starvation.
- 5 i) Pathophysiology of common diseases
 a. Parkinsonism
 b. Schizophrenia
 c. Depression and mania
 d. Hypertension,
 e. Stroke (ischaemic and hemorrhage)
 f. Angina, CCF, Atherosclerosis, Myocardial infarction
 g. Diabetes Mellitus
 h. Peptic ulcer and inflammatory bowel diseases
 i. Cirrhosis and Alcoholic liver diseases
 j. Acute and chronic renal failure
 k. Asthma and chronic obstructive airway diseases


Assignments :

Title of the Experiment

- 1 Chemical Mediators of inflammation
- 2 Drug Hypersensitivity
- 3 Cigarette smoking & its ill effects
- 4 Biological Effects of Radiation
- 5 Etiology and hazards of obesity
- 6 Complications of diabetes
- 7 Diagnosis of cancer
- 8 Disorders of vitamins
- 9 Methods in Pathology- Laboratory values of clinical significance
- 10 Pathophysiology of Dengue Hemorrhagic Fever (DHF)

Format of the assignment

- 1 Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year
4. It shall be computer draft copy.
5. Name and signature of the student
6. Time allocated for presentation may be 8+2Min.


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(17T00205) COMMUNITY PHARMACY (THEORY)

Theory: 3 Hrs./Week

1. **Scope:** In the changing scenario of pharmacy practice in India, Community Pharmacists are expected to offer various pharmaceutical care services. In order to meet this demand, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counselling, health screening services for improved patient care in the community set up.
2. **Objectives:** Upon completion of the course, the student shall be able to –
 - a. know pharmaceutical care services;
 - b. know the business and professional practice management skills in community pharmacies;
 - c. do patient counselling & provide health screening services to public in community pharmacy;
 - d. respond to minor ailments and provide appropriate medication;
 - e. show empathy and sympathy to patients; and
 - f. appreciate the concept of Rational drug therapy.

Text Books:

- a. Health Education and Community Pharmacy by N.S.Parmar.
- b. WHO consultative group report.
- c. Drug store & Business management by Mohammed Ali & Jyoti.

Reference books:

- a. Handbook of pharmacy – health care. Edt. Robin J Harman. The Pharmaceutical press.
- b. Comprehensive Pharmacy Review – Edt. Leon Shargel. Lippincott Williams & Wilkins.

Special requirements:

1. Either the college is having model community pharmacy (meeting the schedule N requirement) or sign MoU with at least 4-5 community pharmacies nearby to the college for training the students on dispensing and counselling activities.
2. Special equipments like B.P apparatus, Glucometer, Peak flow meter, and apparatus for cholesterol estimation.

3. Scheme of evaluation (80 Marks)

- | | |
|--|----|
| 1. Synopsis | 10 |
| 2. Major Experiment | 30 |
| (Counselling of patients with specific diseases – emphasis should be given on Counselling introduction, content, process and conclusion) | |
| 3. Minor Experiment (Ability to measure B.P/ CBG / Lung function) | 15 |
| 4. Prescription Analysis (Analyzing the prescriptions for probable drug interaction and ability to tell the management) | 15 |
| 5. Viva – Voce | 10 |

Lecture wise programme:

Topics

- 1 **Definition, scope, of community pharmacy**
Roles and responsibilities of Community pharmacist
Community Pharmacy Management
 - a) Selection of site, Space layout, and design
 - b) Staff, Materials- coding, stocking
 - c) Legal requirements

- d) Maintenance of various registers
 e) Use of Computers: Business and health care soft wares
- 2 **Prescriptions** – parts of prescription, legality & identification of medication related problems like drug interactions.
Inventory control in community pharmacy
 Definition, various methods of Inventory Control
 ABC, VED, EOQ, Lead time, safety stock
Pharmaceutical care
 Definition and Principles of Pharmaceutical care.
- 3 **Patient counselling**
 Definition, outcomes, various stages, barriers, Strategies to overcome barriers Patient information leaflets- content, design, & layouts, advisory labels
Patient medication adherence
 Definition, Factors affecting medication adherence, role of pharmacist in improving the adherence.
Health screening services
 Definition, importance, methods for screening
 Blood pressure/ blood sugar/ lung function and Cholesterol testing
- 4 **OTC Medication-** Definition, OTC medication list & Counselling
Health Education
 WHO Definition of health, and health promotion, care for children, pregnant & breast feeding women, and geriatric patients.
 Commonly occurring Communicable Diseases, causative agents,
 Clinical presentations and prevention of communicable diseases – Tuberculosis, Hepatitis, Typhoid, Amoebiasis, Malaria, Leprosy, Syphilis, Gonorrhoea and AIDS
 Balance diet, and treatment & prevention of deficiency disorders
 Family planning – role of pharmacist
- 5 **Responding to symptoms of minor ailments**
 Relevant pathophysiology, common drug therapy to,
 Pain, GI disturbances (Nausea, Vomiting, Dyspepsia, diarrhea, constipation), Pyrexia, Ophthalmic symptoms, worms infestations.
Essential Drugs concept and Rational Drug Therapy Role of community pharmacist
 Code of ethics for community pharmacists



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 Nandyal, Andhra Pradesh

(17T00206) PHARMACOTHERAPEUTICS - I (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:** At completion of this subject it is expected that students will be able to understand –
 - a. the pathophysiology of selected disease states and the rationale for drug therapy;
 - b. the therapeutic approach to management of these diseases;
 - c. the controversies in drug therapy;
 - d. the importance of preparation of individualised therapeutic plans based on diagnosis;
 - e. 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);
 - f. describe the pathophysiology of selected disease states and explain the rationale for drug therapy;
 - g. summarise the therapeutic approach to management of these diseases including reference to the latest available evidence;
 - h. discuss the controversies in drug therapy;
 - i. discuss the preparation of individualised therapeutic plans based on diagnosis; and
 - j. 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

- a. Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone publication.
- b. Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton & Lange.

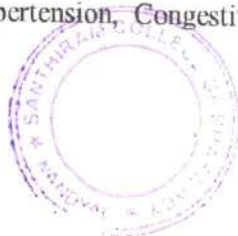
Reference Books


- a. Pathologic basis of disease - Robins SL, W.B.Saunders publication.
- b. Pathology and therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice - Green and Harris, Chapman and Hall publication.
- c. Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication.
- d. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA
- e. Avery's Drug Treatment, 4th Edn, 1997, Adis International Limited.
- f. Relevant review articles from recent medical and pharmaceutical literature.

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

Title of the topic

1. **Cardiovascular system:** Hypertension, Congestive cardiac failure,

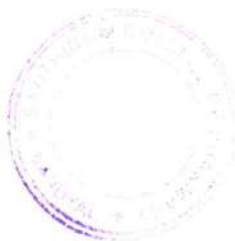




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Angina Pectoris, Myocardial infarction, Hyperlipidaemias , Electrophysiology of heart and Arrhythmias

Respiratory system: Introduction to Pulmonary function test, Asthma, Chronic obstructive airways disease, Drug induced pulmonary diseases

2. **Endocrine system:** Diabetes, Thyroid diseases, Oral contraceptives, Hormone replacement therapy, Osteoporosis
3. General prescribing guidelines for
 - a. Paediatric patients
 - b. Geriatric patients
 - c. Pregnancy and breast feeding
4. Ophthalmology: Glaucoma, Conjunctivitis- viral & bacterial
5. Introduction to rational drug use
Definition, Role of pharmacist Essential drug concept Rational drug formulations




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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
Pharm. D - II YEAR

(17T00209) PHARMACOTHERAPEUTICS - I (PRACTICAL)

Practicals: 3 Hrs. /Week

Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion; attending ward rounds; follow up the progress and changes made in drug therapy in allotted patients; case presentation upon discharge. Students are required to maintain a record of cases presented and the same should be submitted at the end of the course for evaluation. A minimum of 20 cases should be presented and recorded covering most common diseases.

Assignments :

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 – 2000 words] should be submitted for evaluation.

Format of the assignment:

1. Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year.
4. It shall be computer draft copy.
5. Name and signature of the student.
6. Time allocated for presentation may be 8+2 Min.

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).



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2014-15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

Pharm. D - III YEAR

(17T00303) 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, Gonorrhoea and Syphilis
- 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
- 4 **Oncology:** Basic principles of Cancer therapy, General introduction to cancer chemotherapeutic agents, Chemotherapy of breast cancer, leukemia. Management of chemotherapy nausea and emesis
- 5 **Dermatology:** Psoriasis, Scabies, Eczema, Impetigo

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
Pharm. D – III YEAR

((17T00309)) PHARMACOTHERAPEUTICS – II (PRACTICAL)

Practicals: 3 Hrs. /Week

Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion; attending ward rounds; follow up the progress and changes made in drug therapy in allotted patients; case presentation upon discharge. Students are required to maintain a record of cases presented and the same should be submitted at the end of the course for evaluation.

The student shall be trained to understand the principle and practice involved in selection of drug therapy including clinical discussion.

A minimum of 20 cases should be presented and recorded covering most common diseases.

Assignments :

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 – 2000 words] should be submitted for evaluation.

Format of the assignment :


1. Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year.
4. It shall be computer draft copy.
5. Name and signature of the student.
6. Time allocated for presentation may be 8+2 Min.

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).




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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
Pharm. D - IV YEAR

(17T00401) PHARMACOTHERAPEUTICS – III (THEORY)

Theory:3 Hrs. /Week

1. **Scope:** 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:** At completion of this subject it is expected that students will be able to understand –
 - a. the pathophysiology of selected disease states and the rationale for drug therapy;
 - b. the therapeutic approach to management of these diseases;
 - c. the controversies in drug therapy;
 - d. the importance of preparation of individualised therapeutic plans based on diagnosis;
 - e. 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);
 - f. describe the pathophysiology of selected disease states and explain the rationale for drug therapy;
 - g. to summarize the therapeutic approach to management of these diseases including reference to the latest available evidence;
 - h. to discuss the controversies in drug therapy;
 - i. to discuss the preparation of individualised therapeutic plans based on diagnosis; and
 - j. 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).

Etiopathogenesis and pharmacotherapy of diseases associated with following systems/ diseases:

Title of the topic

- 1 **Gastrointestinal system:** Peptic ulcer disease, Gastro Esophageal Reflux Disease, Inflammatory bowel disease, Liver disorders - Alcoholic liver disease, Viral hepatitis including jaundice, and Drug induced liver disorders, Pancreatitis.
 - 2 **Haematological system:** Anaemias, Venous thromboembolism, Drug induced blood disorders.
 - 3 **Nervous system:** Epilepsy, Parkinsonism, Stroke, Alzheimer's disease,
 - 4 **Psychiatry disorders:** Schizophrenia, Affective disorders, Anxiety disorders, Sleep disorders, Obsessive Compulsive disorders, Alcohol Withdrawal Syndrome.
 - 5 Pain management including Pain pathways, neuralgias, and headaches.
- Evidence Based Medicine


Text Books

- a. Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone publication
- b. Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton & Lange

Reference Books


- a. Pathologic basis of disease - Robins SL, W.B.Saunders publication
- b. Pathology and therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice - Green and Harris, Chapman and Hall publication




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- c. Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication
- d. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble
MA
- e. Avery's Drug Treatment, 4th Edn, 1997, Adis International Limited.
- f. Relevant review articles from recent medical and pharmaceutical literature.




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(17T90497) PHARMACOTHERAPEUTICS - III (PRACTICAL)

Practical: 3 Hrs./Week

Practicals:

Hospital postings for a period of at least 50 hours is required to understand the principles and practice involved in ward round participation and clinical discussion on selection of drug therapy. Students are required to maintain a record of 15 cases observed in the ward and the same should be submitted at the end of the course for evaluation. Each student should present at least two medical cases they have observed and followed in the wards.

Etiopathogenesis and pharmacotherapy of diseases associated with following systems/ diseases:

Title of the topic

- 1 **Gastrointestinal system:** Peptic ulcer disease, Gastro Esophageal Reflux Disease, Inflammatory bowel disease, Liver disorders - Alcoholic liver disease, Viral hepatitis including jaundice, and Drug induced liver disorders.
- 2 **Haematological system:** Anaemias, Venous thromboembolism, Drug induced blood disorders.
- 3 **Nervous system:** Epilepsy, Parkinsonism, Stroke, Alzheimer's disease,
- 4 **Psychiatry disorders:** Schizophrenia, Affective disorders, Anxiety disorders, Sleep disorders, Obsessive Compulsive disorders
- 5 Pain management including Pain pathways, neuralgias, and headaches.
- 6 Evidence Based Medicine

Assignments:

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 - 2000 words] should be submitted for evaluation.

Format of the assignment:

1. Minimum & Maximum number of pages
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year
4. It shall be computer draft copy
5. Name and signature of the student
6. Time allocated for presentation may be 8+2 Min.

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).

Theory:

3Hrs/week

- Etiopathogenesis and pharmacotherapy of diseases associated with following systems/ diseases.

1. **Cardiovascular system:** Hypertension, Congestive cardiac failure, Angina Pectoris, Myocardial infarction, Hyperlipidaemias, Electrophysiology of heart and Arrhythmias **13 hrs**
2. **Respiratory system:** Introduction to Pulmonary function test, Asthma, Chronic obstructive airways disease, Drug induced pulmonary diseases **14 hrs**
Endocrine system: Diabetes, Thyroid diseases, Oral contraceptives, Hormone replacement therapy, Osteoporosis
3. **General prescribing guidelines for** **13 hrs**
 - a. Paediatric patients
 - b. Geriatric patients
 - c. Pregnancy and breast feeding**Ophthalmology:** Glaucoma, Conjunctivitis- viral & bacterial
Introduction to rational drug use Definition, Role of pharmacist Essential drug concept Rational drug formulations
Dermatology: Psoriasis, Scabies, Eczema, Impetigo.
4. **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, Gonorrhoea and Syphilis** **18 hrs**
5. **Musculoskeletal disorders: Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic lupus erythematosus.** **17hrs**
Renal system: Acute Renal Failure, Chronic Renal Failure, Renal Dialysis, Drug induced renal disorders
Oncology: Basic principles of Cancer therapy, General introduction to cancer chemotherapeutic agents, Chemotherapy of breast cancer, leukemia. Management of chemotherapy nausea and emesis



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

Pharm. D - IV YEAR

(17T00412) PHARMACOTHERAPEUTICS – I & II (PRACTICAL)

Practicals:

3 Hrs./Week

Practicals:

Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion; attending ward rounds; follow up the progress and changes made in drug therapy in allotted patients; case presentation upon discharge. Students are required to maintain a record of cases presented and the same should be submitted at the end of the course for evaluation. A minimum of 20 cases should be presented and recorded covering most common diseases.

Assignments:

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 – 2000 words] should be submitted for evaluation.

Format of the assignment:

1. Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year.
4. It shall be computer draft copy.
5. Name and signature of the student.
6. Time allocated for presentation may be 8+2 Min.

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	03 hrs	04 hrs

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




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(17T00304) 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: Vallabhprakashan ; 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.
Principle and Significance of professional ethics. Critical study of the code of pharmaceutical ethics drafted by PCI.
2. **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.




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Constitution and Functions of DTAB,DCC,CDL. Qualification and duties –Govt. analyst and Drugs Inspector.

3. **Pharmacy Act –1948.**

Objectives Legal Definitions, General Study, Constitution and Functions of State & Central Council, Registration & Procedure, ER.

Medicinal and Toilet Preparation Act –1955.

Objectives, Legal Definitions, Licensing, Bonded and Non Bonded Laboratory, Ware Housing, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations.

4. **Narcotic Drugs and Psychotropic substances Act-1985 and Rules.** Objectives, Legal Definitions, General Study, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and regulations, Schedules to the Act.

Study of Salient Features of Drugs and magic remedies Act and its rules.

Study of essential Commodities Act Relevant to drugs price control Order.

5. **Drug Price control Order & National Drug Policy (Current).**

Prevention Of Cruelty to animals Act-1960.

Patents & design Act-1970.

Brief study of prescription and Non-prescription Products.

4. **Assignments:**


Format of the assignment

1. Minimum & Maximum number of pages
2. It shall be a computer draft copy
3. Reference(s) shall be included at the end.
4. Name and signature of the student
5. Assignment can be a combined presentation at the end of the academic year.
6. Time allocated for presentation may be 8+2 Min

Case studies relating to

1. Drugs and Cosmetics Act and rules along with its amendments, Dangerous Drugs Act, Medicinal and Toilet preparation Act, New Drug Policy, Professional Ethics, Drugs (Price control) Order, Patent and Design Act.
2. Various prescription and non-prescription products.
3. Medical and surgical accessories.
4. Diagnostic aids and appliances available in the market.




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(17T00402) HOSPITAL PHARMACY (THEORY)

Theory: 2 Hrs. /Week

1. **Scope:** In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug dispensing, manufacturing of parenteral preparations, drug information, patient counselling, and therapeutic drug monitoring for improved patient care.
2. **Objectives:** Upon completion of the course, the student shall be able to –
 - a. know various drug distribution methods;
 - b. know the professional practice management skills in hospital pharmacies;
 - c. provide unbiased drug information to the doctors;
 - d. know the manufacturing practices of various formulations in hospital set up;
 - e. appreciate the practice based research methods; and
 - f. appreciate the stores management and inventory control.

Text books: (latest editions)

- a. Hospital pharmacy by William .E. Hassan
- b. A text book of Hospital Pharmacy by S.H.Merchant&Dr. J.S. Qadry. Revised by R.K.Goyal& R.K. Parikh

References:

- a. WHO consultative group report.
- b. R.P.S. Vol.2. Part –B; Pharmacy Practice section.
- c. Handbook of pharmacy – health care. Edt. Robin J Harman. The Pharmaceutical press.

3. Lecture wise programme :

Topics

- 1 **Hospital** - its Organisation and functions

Hospital pharmacy-Organisation and management

- a) Organizational structure-Staff, Infrastructure & work load statistics
- b) Management of materials and finance
- c) Roles & responsibilities of hospital pharmacist

- 2 **The Budget** – Preparation and implementation

Hospital drug policy

- a) Pharmacy and Therapeutic committee (PTC)
- b) Hospital formulary
- c) Hospital committees
 - Infection committee
 - Research and ethical committee
- d) developing therapeutic guidelines
- e) Hospital pharmacy communication - Newsletter

3.Hospital pharmacy services

- a) Procurement & warehousing of drugs and Pharmaceuticals
- b) Inventory control
Definition, various methods of Inventory Control ABC, VED, EOQ, Lead time, safety stock
- c) Drug distribution in the hospital

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- i) Individual prescription method
- ii) Floor stock method
- iii) Unit dose drug distribution method
- d) Distribution of Narcotic and other controlled substances
- e) Central sterile supply services – Role of pharmacist

4. Manufacture of Pharmaceutical preparations

- a) Sterile formulations – large and small volume parenterals
- b) Manufacture of Ointments, Liquids, and creams
- c) Manufacturing of Tablets, granules, capsules, and powders
- d) Total parenteral nutrition

5 Continuing professional development programs

Education and training

Radio Pharmaceuticals – Handling and packaging

Professional Relations and practices of hospital pharmacist



(17T00408) HOSPITAL PHARMACY (PRACTICAL)

Practical:3 Hrs./Week

1. Assessment of drug interactions in the given prescriptions
2. Manufacture of parenteral formulations, powders.
3. Drug information queries.
4. Inventory control

List of Assignments:

1. Design and Management of Hospital pharmacy department for a 300 bedded hospital.
2. Pharmacy and Therapeutics committee – Organization, functions, and limitations.
3. Development of a hospital formulary for 300 bedded teaching hospital
4. Preparation of ABC analysis of drugs sold in one month from the pharmacy.
5. Different phases of clinical trials with elements to be evaluated.
6. Various sources of drug information and systematic approach to provide unbiased drug information.
7. Evaluation of prescriptions generated in hospital for drug interactions and find out the suitable management.


Special requirements:

1. Each college should sign MoU with nearby local hospital having minimum 150 beds for providing necessary training to the students' on hospital pharmacy activities.
2. Well equipped with various resources of drug information.

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).


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(17T00403) CLINICAL PHARMACY (THEORY)

Theory :3 Hrs. /Week

1. Objectives of the Subject :

Upon completion of the subject student shall be able to (Know, do, appreciate) –

- a. monitor drug therapy of patient through medication chart review and clinical review;
- b. obtain medication history interview and counsel the patients;
- c. identify and resolve drug related problems;
- d. detect, assess and monitor adverse drug reaction;
- e. interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states; and
- f. retrieve, analyse, interpret and formulate drug or medicine information.

Text books (Theory)

- a. Practice Standards and Definitions - The Society of Hospital Pharmacists of Australia.
- b. Basic skills in interpreting laboratory data - Scott LT, American Society of Health System Pharmacists Inc.
- c. Biopharmaceutics and Applied Pharmacokinetics - Leon Shargel, Prentice Hall publication.
- d. A text book of Clinical Pharmacy Practice; Essential concepts and skills, Dr.G.Parthasarathietal, Orient OrientLangramPvt.Ltd. ISSN8125026

References

- a. Australian drug information -Procedure manual. The Society of Hospital Pharmacists of Australia.
- b. Clinical Pharmacokinetics - Rowland and Tozer, Williams and Wilkins Publication.
- c. Pharmaceutical statistics. Practical and clinical applications. Sanford Bolton, Marcel Dekker, Inc.


2. Detailed syllabus and lecture wise schedule:

Title of the topic

1. Definitions, development and scope of clinical pharmacy
Introduction to daily activities of a clinical pharmacist
 - a. Drug therapy monitoring (medication chart review, clinical review, pharmacist interventions)
 - b. Ward round participation
 - c. Adverse drug reaction management
 - d. Drug information and poisons information
 - e. Medication history
 - f. Patient counseling
 - g. Drug utilisation evaluation (DUE) and review (DUR)
 - h. Quality assurance of clinical pharmacy services

Patient data analysis




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The patient's case history, its structure and use in evaluation of drug therapy & Understanding common medical abbreviations and terminologies used in clinical practices.

2. **Clinical laboratory tests used in the evaluation of disease states, and interpretation of test results**
 - a. Haematological, Liver function, Renal function, thyroid function tests
 - b. Tests associated with cardiac disorders
 - c. Fluid and electrolyte balance
 - d. Microbiological culture sensitivity tests
 - e. Pulmonary Function Tests

3. **Drug & Poison information**
 - a. Introduction to drug information resources available
 - b. Systematic approach in answering DI queries
 - c. Critical evaluation of drug information and literature
 - d. Preparation of written and verbal reports
 - e. Establishing a Drug Information Centre
 - f. Poisons information- organization & information resources

4. **Pharmacovigilance**
 - a. Scope, definition and aims of pharmacovigilance
 - b. Adverse drug reactions - Classification, mechanism, predisposing factors, causality assessment [different scales used]
 - c. Reporting, evaluation, monitoring, preventing & management of ADRs
 - d. Role of pharmacist in management of ADR.

5. Communication skills, including patient counselling techniques, medication history interview, presentation of cases.
Pharmaceutical care concepts
Critical evaluation of biomedical literature
Medication errors




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(17T00409) CLINICAL PHARMACY (PRACTICAL)

Practical:3 Hrs./Week

Students are expected to perform 15 practicals in the following areas covering the topics dealt in theory class.

- a. Answering drug information questions (4 Nos)
- b. Patient medication counselling (4 Nos)
- c. Case studies related to laboratory investigations (4 Nos)
- d. Patient medication history interview (3 Nos)

Assignment:

Students are expected to submit THREE written assignments (1500 – 2000 words) on the topics given to them covering the following areas dealt in theory class.

Drug information, Patient medication history interview, Patient medication counselling, Critical appraisal of recently published articles in the biomedical literature which deals with a drug or therapeutic issue.

Format of the assignment:

1. Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year.
4. It shall be computer draft copy.
5. Name and signature of the student.
6. Time allocated for presentation may be 8+2 Min



(17T00404) BIostatISTICS AND RESEARCH METHODOLOGY (THEORY)

Theory: 2 Hrs. /Week

1. Detailed syllabus and lecture wise schedule
Research Methodology
 - a) Types of clinical study designs:
Case studies, observational studies, interventional studies,
 - b) Designing the methodology
 - c) Sample size determination and Power of a study
Determination of sample size for simple comparative experiments,
determination of sample size to obtain a confidence interval of specified width,
power of a study
 - d) Report writing and presentation of data
2. **Biostatistics**
 - 2.1 a) Introduction
 - b) Types of data distribution
 - c) Measures describing the central tendency distributions- average, median, mode
 - d) Measurement of the spread of data-range, variation of mean, standard deviation, variance, coefficient of variation, standard error of mean.
 - 2.2 **Data graphics**
Construction and labeling of graphs, histogram, piecharts, scatter plots, semi logarithmic plots
3. **Basics of testing hypothesis**
 - a) Null hypothesis, level of significance, power of test, P value, statistical estimation of confidence intervals.
 - b) Level of significance (Parametric data)- students t test (paired and unpaired), chi Square test, Analysis of Variance (one-way and two-way)
 - c) Level of significance (Non-parametric data)- Sign test, Wilcoxon's signed rank test, Wilcoxon rank sum test, Mann Whitney U test, Kruskal-Wallis test (one way ANOVA)
 - d) Linear regression and correlation- Introduction, Pearson's and Spearman's correlation and correlation co-efficient.
 - e) Introduction to statistical software: SPSS, Epi Info, SAS.
4. **Statistical methods in epidemiology**
Incidence and prevalence, relative risk, attributable risk
5. **Computer applications in pharmacy**
Computer System in Hospital Pharmacy: Patterns of Computer use in Hospital Pharmacy – Patient record database management, Medication order entry – Drug labels and list – Intravenous solution and admixture, patient medication profiles, Inventory control, Management report & Statistics.
Computer In Community Pharmacy
Computerizing the Prescription Dispensing process


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Use of Computers for Pharmaceutical Care in community pharmacy Accounting and General ledger system

Drug Information Retrieval & Storage:

Introduction – Advantages of Computerized Literature Retrieval

Use of Computerized Retrieval

Reference books:

- a. Pharmaceutical statistics- practical and clinical applications, Sanford Bolton 3rd edition, publisher Marcel Dekker Inc. NewYork.
- b. Drug Information- A Guide for Pharmacists, Patrick M Malone, Karen L Kier, John E Stanovich , 3rd edition, McGraw Hill Publications 2006



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(17T00501) CLINICAL RESEARCH (THEORY)

Theory:3 Hrs. /Week

1. Drug development process:

Introduction

Various Approaches to drug discovery

1. Pharmacological
2. Toxicological
3. IND Application
4. Drug characterization
5. Dosage form

2. Clinical development of drug:

1. Introduction to Clinical trials
2. Various phases of clinical trial.
3. Methods of post marketing surveillance
4. Abbreviated New Drug Application submission.

3.

1. Good Clinical Practice – ICH, GCP, Central drug standard control organisation (CDSCO) guidelines
2. Challenges in the implementation of guidelines
3. Ethical guidelines in Clinical Research
4. Composition, responsibilities, procedures of IRB / IEC

4.

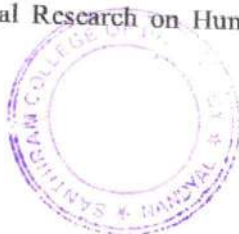
1. Overview of regulatory environment in USA, Europe and India.
2. Role and responsibilities of clinical trial personnel as per ICH GCP
 - a. Sponsor
 - b. Investigators
 - c. Clinical research associate
 - d. Auditors
 - e. Contract research coordinators
 - f. Regulatory authority

5.

1. Designing of clinical study documents (protocol, CRF, ICF, PIC with assignment)
2. Informed consent Process
3. Data management and its components
4. Safety monitoring in clinical trials.

References:

- a. Central Drugs Standard Control Organization. Good Clinical Practices-Guidelines for Clinical Trials on Pharmaceutical Products in India. New Delhi: Ministry of Health; 2001.
- b. International Conference on Harmonisation of Technical requirements for registration of Pharmaceuticals for human use. ICH Harmonised Tripartite Guideline. Guideline for Good Clinical Practice.E6; May 1996.
- c. Ethical Guidelines for Biomedical Research on Human Subjects 2000. Indian Council of Medical Research, New Delhi.



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- d. Textbook of Clinical Trials edited by David Machin, Simon Day and Sylvan Green, March 2005, John Wiley and Sons.
- e. Principles of Clinical Research edited by Giovanna di Ignazio, Di Giovanna and Haynes.
- f. Clinical Data Management edited by R K Rondels, S A Varley, C F Webbs. Second Edition, Jan 2000, Wiley Publications.
- g. Goodman & Gilman: JG Hardman, LE Limbard, 10th Edn. McGraw Hill Publications, 2001.



(17T00502) PHARMACOEPIDEMIOLOGY AND PHARMACOECONOMICS (THEORY)
Theory :3 Hrs. /Week

1. **Pharmacoepidemiology:**
Definition and scope:
Origin and evaluation of pharmacoepidemiology need for pharmacoepidemiology, aims and applications.
Measurement of outcomes in pharmacoepidemiology
Outcome measure and drug use measures
Prevalence, incidence and incidence rate. Monetary units, number of prescriptions, units of drugs dispensed, defined daily doses and prescribed daily doses, medication adherence measurement
2. **Concept of risk in pharmacoepidemiology**
Measurement of risk, attributable risk and relative risk, time-risk relationship and odds ratio
Pharmacoepidemiological methods
Includes theoretical aspects of various methods and practical study of various methods with the help of case studies for individual methods
Drug utilization review, case reports, case series, surveys of drug use, cross – sectional studies, cohort studies, case control studies, case –cohort studies, meta – analysis studies, spontaneous reporting, prescription event monitoring and record linkage system.
3. **Sources of data for pharmacoepidemiological studies**
Ad Hoc data sources and automated data systems.
Selected special applications of pharmacoepidemiology
Studies of vaccine safety, hospital pharmacoepidemiology, pharmacoepidemiology and risk management, drug induced birth defects.
4. **Pharmacoeconomics:**
Definition, history, needs of pharmacoeconomic evaluations
Role in formulary management decisions
Pharmacoeconomic evaluation
Outcome assessment and types of evaluation
Includes theoretical aspects of various methods and practical study of various methods with the help of case studies for individual methods: Cost – minimization, cost- benefit, cost – effectiveness, cost utility
5. **Applications of Pharmacoeconomics**
Software and case studies




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(17T00503) CLINICAL PHARMACOKINETICS AND PHARMACOTHERAPEUTIC DRUG
MONITORING (THEORY)

Theory :2 Hrs. /Week

1. **Introduction to Clinical pharmacokinetics.**
Design of dosage regimens:
Nomograms and Tabulations in designing dosage regimen, Conversion from intravenous to oral dosing, Determination of dose and dosing intervals, Drug dosing in the elderly and pediatrics and obese patients.
 2. **Pharmacokinetics of Drug Interaction:**
 - a. Pharmacokinetic drug interactions
 - b. Inhibition and Induction of Drug metabolism
 - c. Inhibition of Biliary Excretion.
 3. **Therapeutic Drug monitoring:**
 - a. Introduction
 - b. Individualization of drug dosage regimen (Variability – Genetic, Age and Weight , disease, Interacting drugs).
 - c. Indications for TDM. Protocol for TDM.
 - d. Pharmacokinetic/Pharmacodynamic Correlation in drug therapy.
 - e. TDM of drugs used in the following disease conditions: cardiovascular disease, Seizure disorders, Psychiatric conditions, and Organ transplantations.
 4. **Dosage adjustment in Renal and hepatic Disease.**
 - a. Renal impairment
 - b. Pharmacokinetic considerations
 - c. General approach for dosage adjustment in Renal disease.
 - d. Measurement of Glomerular Filtration rate and creatinine clearance.
 - e. Dosage adjustment for uremic patients.
 - f. Extracorporeal removal of drugs.
 - g. Effect of Hepatic disease on pharmacokinetics.
 5. **Population Pharmacokinetics.**
 - a. Introduction to Bayesian Theory.
 - b. Adaptive method or Dosing with feed back.
 - c. Analysis of Population pharmacokinetic Data.
- Pharmacogenetics**
- a. Genetic polymorphism in Drug metabolism: Cytochrome P-450 Isoenzymes.
 - b. Genetic Polymorphism in Drug Transport and Drug Targets.
 - c. Pharmacogenetics and Pharmacokinetics/Pharmacodynamic considerations



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(Established by Govt. of A.P., Act. No. 30 of 2008)
ANANTHAPURAMU-515 002 (A.P) INDIA

Academic Regulations (R19) for
B.Pharm (Regular-Full time)
(Effective for the students admitted into 1 year from the Academic Year 2019-2020 onwards)

Pharmacy Council of India
New Delhi

Rules & Syllabus for the Bachelor of Pharmacy (B. Pharm) Course

[Framed under Regulation 6, 7 & 8 of the Bachelor of
Pharmacy (B. Pharm) course regulations 2014]

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9. Course of study

The course of study for B. Pharm shall include Semester Wise Theory & Practical as given in Table – I to VIII. The number of hours to be devoted to each theory, tutorial and practical course in any semester shall not be less than that shown in Table – I to VIII.

Table-I: Course of study for semester I

Course code	Name of the course	No. of Hours	Tutorial	Credit points
BP101T	Human Anatomy and Physiology I – Theory	3	1	4
BP102T	Pharmaceutical Analysis I – Theory	3	1	4
BP103T	Pharmaceutics I – Theory	3	1	4
BP104T	Pharmaceutical Inorganic Chemistry – Theory	3	1	4
BP105T	Communication skills – Theory *	2	-	2
BP106RBT BP106RMT	Remedial Biology/ Remedial Mathematics – Theory*	2	-	2
BP107P	Human Anatomy and Physiology – Practical	4	-	2
BP108P	Pharmaceutical Analysis I – Practical	4	-	2
BP109P	Pharmaceutics I – Practical	4	-	2
BP110P	Pharmaceutical Inorganic Chemistry – Practical	4	-	2
BP111P	Communication skills – Practical*	2	-	1
BP112RBP	Remedial Biology – Practical*	2	-	1
BP113CV	Comprehensive Viva-Voce ^e – I	-	-	-
Total		32/34^s/36^d	4	27/29^s/30^d

^sApplicable ONLY for the students who have studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB) course.

^dApplicable ONLY for the students who have studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics (RM) course.

* Non University Examination (NUE)

^e Non University Examination (NUE) with grading



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Table-II: Course of study for semester II

Course Code	Name of the course	No. of hours	Tutorial	Credit points
BP201T	Human Anatomy and Physiology II – Theory	3	1	4
BP202T	Pharmaceutical Organic Chemistry I – Theory	3	1	4
BP203T	Biochemistry – Theory	3	1	4
BP204T	Pathophysiology – Theory	3	1	4
BP205T	Computer Applications in Pharmacy – Theory *	3	-	3
BP206T	Environmental sciences – Theory *	3	-	3
BP207P	Human Anatomy and Physiology II – Practical	4	-	2
BP208P	Pharmaceutical Organic Chemistry I – Practical	4	-	2
BP209P	Biochemistry – Practical	4	-	2
BP210P	Computer Applications in Pharmacy – Practical*	2	-	1
BP211CV	Comprehensive Viva-Voce [†] – II	-	-	-
Total		32	4	29

* Non University Examination (NUE)

† Non University Examination (NUE) with grading

Table-III: Course of study for semester III

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP301T	Pharmaceutical Organic Chemistry II – Theory	3	1	4
BP302T	Physical Pharmaceutics I – Theory	3	1	4
BP303T	Pharmaceutical Microbiology – Theory	3	1	4
BP304T	Pharmaceutical Engineering – Theory	3	1	4
BP305P	Pharmaceutical Organic Chemistry II – Practical	4	-	2
BP306P	Physical Pharmaceutics I – Practical	4	-	2
BP307P	Pharmaceutical Microbiology – Practical	4	-	2
BP 308P	Pharmaceutical Engineering – Practical	4	-	2
BP309CV	Comprehensive Viva-Voce [†] – III	-	-	-
Total		28	4	24

† Non University Examination (NUE) with grading



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Table-IV: Course of study for semester IV

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP401T	Pharmaceutical Organic Chemistry III - Theory	3	1	4
BP402T	Medicinal Chemistry I - Theory	3	1	4
BP403T	Physical Pharmaceutics II - Theory	3	1	4
BP404T	Pharmacology I - Theory	3	1	4
BP405T	Pharmacognosy and Phytochemistry I - Theory	3	1	4
BP406P	Medicinal Chemistry I - Practical	4	-	2
BP407P	Physical Pharmaceutics II - Practical	4	-	2
BP408P	Pharmacology I - Practical	4	-	2
BP409P	Pharmacognosy and Phytochemistry I - Practical	4	-	2
BP410CV	Comprehensive Viva-Voce ^c - IV	-	-	-
Total		31	5	28

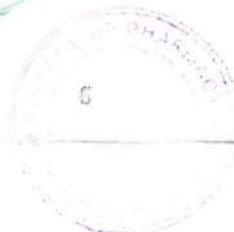
^c Non University Examination (NUE) with grading

Table-V: Course of study for semester V

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP501T	Medicinal Chemistry II - Theory	3	1	4
BP502T	Industrial Pharmacy I - Theory	3	1	4
BP503T	Pharmacology II - Theory	3	1	4
BP504T	Pharmacognosy and Phytochemistry II - Theory	3	1	4
BP505T	Pharmaceutical Jurisprudence - Theory	3	1	4
BP506P	Industrial Pharmacy I - Practical	4	-	2
BP507P	Pharmacology II - Practical	4	-	2
BP508P	Pharmacognosy and Phytochemistry II - Practical	4	-	2
BP509CV	Comprehensive Viva-Voce ^c - V	-	-	-
Total		27	5	26

^c Non University Examination (NUE) with grading

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Table-VI: Course of study for semester VI

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP601T	Medicinal Chemistry III - Theory	3	1	4
BP602T	Pharmacology III - Theory	3	1	4
BP603T	Herbal Drug Technology - Theory	3	1	4
BP604T	Biopharmaceutics and Pharmacokinetics - Theory	3	1	4
BP605T	Pharmaceutical Biotechnology - Theory	3	1	4
BP606T	Quality Assurance - Theory	3	1	4
BP607P	Medicinal chemistry III - Practical	4	-	2
BP608P	Pharmacology III - Practical	1	-	2
BP609P	Herbal Drug Technology - Practical	4	-	2
BP610CV	Comprehensive Viva-Voce ⁵ - VI	-	-	-
Total		30	6	30

⁵ Non University Examination (NUE) with grading

Table-VII: Course of study for semester VII

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP701T	Instrumental Methods of Analysis - Theory	3	1	4
BP702T	Industrial Pharmacy II - Theory	3	1	4
BP703T	Pharmacy Practice - Theory	3	1	4
BP704T	Novel Drug Delivery System - Theory	3	1	4
BP705P	Instrumental Methods of Analysis - Practical	4	-	2
BP706FS	Practice School*	12	-	6
BP707MC	Constitution of India ⁵	-	-	-
BP708CV	Comprehensive Viva-Voce ⁵ - VII	-	-	-
Total		28	5	24

* Non University Examination (NUE)

⁵ Non University Examination (NUE) with grading

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Table-VIII: Course of study for semester VIII

Course code	Name of the course	No. of Hours	Tutorial	Credit points
BP801T	Biostatistics and Research Methodology	3	1	4
BP802T	Social and Preventive Pharmacy	3	1	4
BP803LT	Pharma Marketing Management	3 + 3 = 6	1 + 1 = 2	4 + 4 = 8
BP804ET	Pharmaceutical Regulatory Science			
BP805ET	Pharmacovigilance			
BP806LT	Quality Control and Standardization of Herbs			
BP807ET	Computer Aided Drug Design			
BP808LT	Cell and Molecular Biology			
BP809ET	Cosmetic Science			
BP810ET	Experimental Pharmacology			
BP811ET	Advanced Instrumentation Techniques			
BP812ET	Dietary Supplements and Nutraceuticals			
BP813PW	Project Work	12	-	6
BP814MC	Essence of India Traditional Knowledge [†]	-	-	-
BP815CV	Comprehensive Viva-Voce [‡] - VIII	-	-	-
Total		24	4	22

[†] Non University Examination (NUE) with grading

Table-IX: Semester wise credits distribution

Semester	Credit Points
I	27/29 [§] /30 [¶]
II	29
III	26
IV	28
V	26
VI	26
VII	24
VIII	22
Extracurricular/ Co-curricular activities	01*
Total credit points for the program	209/211 [§] /212 [¶]

* The credit points assigned for extracurricular and or co-curricular activities shall be given by the Principals of the colleges and the same shall be submitted to the University. The criteria to acquire this credit point shall be defined by the colleges from time to time.

[§] Applicable ONLY for the students studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics course.

[¶] Applicable ONLY for the students studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology course.



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BP101T. HUMAN ANATOMY AND PHYSIOLOGY-I (Theory)

45 Hours

Scope: 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.

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

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the various experiments related to special senses and nervous system.
5. Appreciate coordinated working pattern of different organs of each system

Course Content:

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



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- **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, hemopoiesis, 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.




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BP107P. HUMAN ANATOMY AND PHYSIOLOGY (Practical)

4 Hours/week

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. Microscopic study of epithelial and connective tissue
3. Microscopic study of muscular and nervous tissue
4. Identification of axial bones
5. Identification of appendicular bones

6. Introduction to hemocytometry.
7. Enumeration of white blood cell (WBC) count
8. Enumeration of total red blood corpuscles (RBC) count
9. Determination of bleeding time
10. Determination of clotting time
11. Estimation of hemoglobin content
12. Determination of blood group.
13. Determination of erythrocyte sedimentation rate (ESR).
14. Determination of heart rate and pulse rate.
15. Recording of blood pressure.

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 Taylor. 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. Chatterje ,Academic Publishers Kolkata

BP105T.COMMUNICATION SKILLS (Theory)

30 Hours

Scope: This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.

Objectives:

Upon completion of the course the student shall be able to

1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
2. Communicate effectively (Verbal and Non Verbal)
3. Effectively manage the team as a team player
4. Develop interview skills
5. Develop Leadership qualities and essentials

Course content:

UNIT – I

07 Hours

- **Communication Skills:** Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context
- **Barriers to communication:** Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers
- **Perspectives in Communication:** Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment

UNIT – II

07 Hours

- **Elements of Communication:** Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication
- **Communication Styles:** Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style

BP203 T. BIOCHEMISTRY (Theory)

45 Hours

Scope: 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.

Objectives: Upon completion of course student shall 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.

Course Content:

UNIT I

08 Hours

- **Biomolecules**

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

- **Bioenergetics**

Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential.

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.

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Oxidative phosphorylation & its mechanism and substrate level phosphorylation

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

Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenylketonuria, Albinism, alpeptonuria, tyrosinemia)

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

Catabolism of heme; hyperbilirubinemia and jaundice

UNIT IV

10 Hours

- **Nucleic acid metabolism and genetic information transfer**

Biosynthesis of purine and pyrimidine nucleotides

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




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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 –Structure and biochemical functions

BP 209 P. BIOCHEMISTRY (Practical)

4 Hours / Week

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
10. Determination of Salivary amylase activity
11. Study the effect of Temperature on Salivary amylase activity.
12. Study the effect of substrate concentration on salivary amylase activity.




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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.

BP 204T.PATHOPHYSIOLOGY (THEORY)

45Hours

Scope: Pathophysiology is the study of causes of diseases and reactions of the body to such disease producing causes. This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.

Objectives: Upon completion of the subject student shall be able to –

1. Describe the etiology and pathogenesis of the selected disease states;
2. Name the signs and symptoms of the diseases; and
3. Mention the complications of the diseases.

Course content:

Unit I

10Hours

- **Basic principles of Cell injury and Adaptation:**
Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury, Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage), Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis & Alkalosis, Electrolyte imbalance

- **Basic mechanism involved in the process of inflammation and repair:**
Introduction, Clinical signs of inflammation, Different types of Inflammation, Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's, Mediators of inflammation, Basic principles of wound healing in the skin, Pathophysiology of Atherosclerosis

Unit II

10Hours

- **Cardiovascular System:**
Hypertension, congestive heart failure, ischemic heart disease (angina, myocardial infarction, atherosclerosis and arteriosclerosis)
- **Respiratory system:** Asthma, Chronic obstructive airways diseases.
- **Renal system:** Acute and chronic renal failure

Unit II

10Hours

- **Haematological Diseases:**
Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalassemia, hereditary acquired anemia, hemophilia
- **Endocrine system:** Diabetes, thyroid diseases, disorders of sex hormones
- **Nervous system:** Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease.
- **Gastrointestinal system:** Peptic Ulcer

Unit IV

8 Hours

- Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease.
- **Disease of bones and joints:** Rheumatoid arthritis, osteoporosis and gout
- **Principles of cancer:** classification, etiology and pathogenesis of cancer
- **Diseases of bones and joints:** Rheumatoid Arthritis, Osteoporosis, Gout
- **Principles of Cancer:** Classification, etiology and pathogenesis of Cancer

Unit V

7 Hours

- **Infectious diseases:** Meningitis, Typhoid, Leprosy, Tuberculosis

Urinary tract infections

- **Sexually transmitted diseases:** AIDS, Syphilis, Gonorrhoea

Recommended Books (Latest Editions)

1. Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins & Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014.
2. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010.
3. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011.
4. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor's Physiological basis of medical practice; 12th ed; united states;
5. William and Wilkins, Baltimore; 1991 [1990 printing].
6. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston; Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/Churchill Livingstone; 2010.
7. Guyton A, John .E Hall; Textbook of Medical Physiology; 12th edition; WB Saunders Company; 2010.
8. Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey; Pharmacotherapy: A Pathophysiological Approach; 9th edition; London; McGraw-Hill Medical; 2014.
9. V. Kumar, R. S. Cotran and S. L. Robbins; Basic Pathology; 6th edition; Philadelphia; WB Saunders Company; 1997.
10. Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3rd edition; London; Churchill Livingstone publication; 2003.

Recommended Journals

1. The Journal of Pathology. ISSN: 1096-9896 (Online)
2. The American Journal of Pathology. ISSN: 0002-9440
3. Pathology. 1465-3931 (Online)
4. International Journal of Physiology, Pathophysiology and Pharmacology. ISSN: 1944-8171 (Online)
5. Indian Journal of Pathology and Microbiology. ISSN-0377-4929.



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BP 206 T. ENVIRONMENTAL SCIENCES (Theory)

30 hours

Scope: Environmental Sciences is the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.


Objectives: Upon completion of the course the student shall be able to:

1. Create the awareness about environmental problems among learners.
2. Impart basic knowledge about the environment and its allied problems.
3. Develop an attitude of concern for the environment.
4. Motivate learner to participate in environment protection and environment improvement.
5. Acquire skills to help the concerned individuals in identifying and solving environmental problems.
6. Strive to attain harmony with Nature.

Course content:

Unit-I The Multidisciplinary nature of environmental studies Natural Resources Renewable and non-renewable resources: Natural resources and associated problems a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.	10hours
Unit-II Ecosystems <ul style="list-style-type: none">▪ Concept of an ecosystem.▪ Structure and function of an ecosystem.▪ Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	10hours
Unit- III Environmental Pollution: Air pollution; Water pollution; Soil pollution	10hours




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Recommended Books (Latest edition):

1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India,
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S., Marine Pollution, Clarendon Press Oxford
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
8. Down of Earth, Centre for Science and Environment



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BP 505 T. PHARMACEUTICAL JURISPRUDENCE (Theory)

45 Hours

Scope: This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy in India.

Objectives: Upon completion of the course, the student shall be able to understand:

1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
2. Various Indian pharmaceutical Acts and Laws
3. The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
4. The code of ethics during the pharmaceutical practice

Course Content:

UNIT-I

10 Hours

Drugs and Cosmetics Act, 1940 and its rules 1945:

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

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

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

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

UNIT-II

10 Hours

Drugs and Cosmetics Act, 1940 and its rules 1945.

Detailed study of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA)

Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties

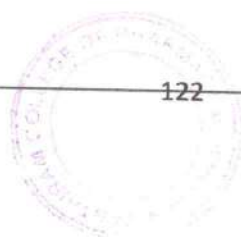
Labeling & Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties.

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

UNIT-III

10 Hours

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



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Penalties

- **Medicinal and Toilet Preparation Act –1955:** Objectives, Definitions, Licensing, Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties.
- **Narcotic Drugs and Psychotropic substances Act-1985 and Rules:** Objectives, Definitions, Authorities and Officers, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, Offences and Penalties

UNIT-IV

08 Hours

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

UNIT-V

07 Hours

- **Pharmaceutical Legislations –** A brief review, Introduction, Study of drugs enquiry committee, Health survey and development committee, Hathi committee and Mudaliar committee
- **Code of Pharmaceutical ethics** Definition, Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath
- **Medical Termination of Pregnancy Act**
- **Right to Information Act**
- **Introduction to Intellectual Property Rights (IPR)**

Recommended books: (Latest Edition)

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

BP801T. BIOSTATISTICS AND RESEARCH METHODOLOGY (Theory)

45 Hours

Scope: To understand the applications of Biostatistics in Pharmacy. This subject deals with descriptive statistics, Graphics, Correlation, Regression, logistic regression Probability theory, Sampling technique, Parametric tests, Non Parametric tests, ANOVA, Introduction to Design of Experiments, Phases of Clinical trials and Observational and Experimental studies, SPSS, R and MINITAB statistical software's, analyzing the statistical data using Excel.

Objectives: Upon completion of the course the student shall be able to

- Know the operation of M.S. Excel, SPSS, R and MINITAB[®], DoE (Design of Experiment)
- Know the various statistical techniques to solve statistical problems
- Appreciate statistical techniques in solving the problems.

Course content:

Unit-I

10 Hours

Introduction: Statistics, Biostatistics, Frequency distribution

Measures of central tendency: Mean, Median, Mode- Pharmaceutical examples

Measures of dispersion: Dispersion, Range, standard deviation, Pharmaceutical problems

Correlation: Definition, Karl Pearson's coefficient of correlation, Multiple correlation - Pharmaceuticals examples

Unit-II

10 Hours

Regression: Curve fitting by the method of least squares, fitting the lines $y = a + bx$ and $x = a + by$, Multiple regression, standard error of regression- Pharmaceutical Examples

Probability: Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties - problems

Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical examples


Parametric test: t-test (Sample, Pooled or Unpaired and Paired), ANOVA, (One way and Two way), Least Significance difference

Unit-III

10 Hours

Non Parametric tests: Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test




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Introduction to Research: Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism

Graphs: Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph

Designing the methodology: Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.

Unit-IV

8 Hours

Blocking and confounding system for Two-level factorials

Regression modeling: Hypothesis testing in Simple and Multiple regression models

Introduction to Practical components of Industrial and Clinical Trials Problems:

Statistical Analysis Using Excel, SPSS, MINITAB[®], DESIGN OF EXPERIMENTS, R - Online Statistical Software's to Industrial and Clinical trial approach

Unit-V

7Hours

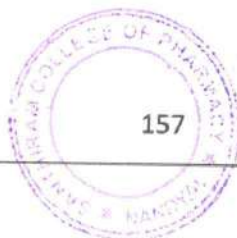
Design and Analysis of experiments:

Factorial Design: Definition, 2^2 , 2^3 design. Advantage of factorial design

Response Surface methodology: Central composite design, Historical design, Optimization Techniques

Recommended Books (Latest edition):

1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. NewYork.
2. Fundamental of Statistics – Himalaya Publishing House- S.C.Guptha
3. Design and Analysis of Experiments –PHI Learning Private Limited, R. Pannerselvam,
4. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery



BP 802T SOCIAL AND PREVENTIVE PHARMACY

Hours: 45

Scope:

The purpose of this course is to introduce to students a number of health issues and their challenges. This course also introduced a number of national health programmes. The roles of the pharmacist in these contexts are also discussed.

Objectives:

After the successful completion of this course, the student shall be able to:

- Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.
- Have a critical way of thinking based on current healthcare development.
- Evaluate alternative ways of solving problems related to health and pharmaceutical issues

Course content:

Unit I:

10 Hours

Concept of health and disease: Definition, concepts and evaluation of public health. Understanding the concept of prevention and control of disease, social causes of diseases and social problems of the sick.

Social and health education: Food in relation to nutrition and health, Balanced diet, Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention.

Sociology and health: Socio cultural factors related to health and disease, Impact of urbanization on health and disease, Poverty and health

Hygiene and health: personal hygiene and health care; avoidable habits

Unit II:

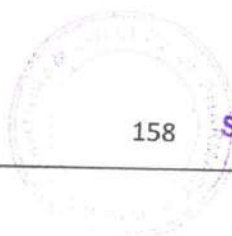
10 Hours

Preventive medicine: General principles of prevention and control of diseases such as cholera, SARS, Ebola virus, influenza, acute respiratory infections, malaria, chicken guinea, dengue, lymphatic filariasis, pneumonia, hypertension, diabetes mellitus, cancer, drug addiction-drug substance abuse


Unit III:

10 Hours

National health programs, its objectives, functioning and outcome of the following: HIV AND AIDS control programme, TB, Integrated disease surveillance program (IDSP), National leprosy control programme, National mental health program, National



158


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Santhiram College of Pharmacy
NH-40, NANDYAL

programme for prevention and control of deafness, Universal immunization programme, National programme for control of blindness, Pulse polio programme.

Unit IV:

08 Hours

National health intervention programme for mother and child, National family welfare programme, National tobacco control programme, National Malaria Prevention Program, National programme for the health care for the elderly, Social health programme; role of WHO in Indian national program

Unit V:

07 Hours


Community services in rural, urban and school health: Functions of PHC, Improvement in rural sanitation, national urban health mission, Health promotion and education in school.

Recommended Books (Latest edition):

1. Short Textbook of Preventive and Social Medicine, Prabhakara GN, 2nd Edition, 2010, ISBN: 9789380704104, JAYPEE Publications
2. Textbook of Preventive and Social Medicine (Mahajan and Gupta), Edited by Roy Rabindra Nath, Saha Indranil, 4th Edition, 2013, ISBN: 9789350901878, JAYPEE Publications
3. Review of Preventive and Social Medicine (Including Biostatistics), Jain Vivek, 6th Edition, 2014, ISBN: 9789351522331, JAYPEE Publications
4. Essentials of Community Medicine—A Practical Approach, Hiremath Lalita D, Hiremath Dhananjaya A, 2nd Edition, 2012, ISBN: 9789350250440, JAYPEE Publications
5. Park Textbook of Preventive and Social Medicine, K Park, 21st Edition, 2011, ISBN-14: 9788190128285, BANARSIDAS BHANOT PUBLISHERS.
6. Community Pharmacy Practice, Ramesh Adepu, BSP publishers, Hyderabad

Recommended Journals:

1. Research in Social and Administrative Pharmacy, Elsevier, Ireland


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BP 805T: PHARMACOVIGILANCE (Theory)

45 hours

Scope: This paper will provide an opportunity for the student to learn about development of pharmacovigilance as a science, basic terminologies used in pharmacovigilance, global scenario of Pharmacovigilance, train students on establishing pharmacovigilance programme in an organization, various methods that can be used to generate safety data and signal detection. This paper also develops the skills of classifying drugs, diseases and adverse drug reactions.

Objectives:

At completion of this paper it is expected that students will be able to (know, do, and appreciate):

1. Why drug safety monitoring is important?
2. History and development of pharmacovigilance
3. National and international scenario of pharmacovigilance
4. Dictionaries, coding and terminologies used in pharmacovigilance
5. Detection of new adverse drug reactions and their assessment
6. International standards for classification of diseases and drugs
7. Adverse drug reaction reporting systems and communication in pharmacovigilance
8. Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle
9. Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation
10. Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India
11. ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning
12. CIOMS requirements for ADR reporting
13. Writing case narratives of adverse events and their quality.

Course Content

Unit I

10 Hours

Introduction to Pharmacovigilance

- History and development of Pharmacovigilance
- Importance of safety monitoring of Medicine
- WHO international drug monitoring programme
- Pharmacovigilance Program of India(PvPI)

Introduction to adverse drug reactions

- Definitions and classification of ADRs
- Detection and reporting
- Methods in Causality assessment
- Severity and seriousness assessment
- Predictability and preventability assessment
- Management of adverse drug reactions

Basic terminologies used in pharmacovigilance



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- Terminologies of adverse medication related events
- Regulatory terminologies

Unit II

10 hours

Drug and disease classification

- Anatomical, therapeutic and chemical classification of drugs
- International classification of diseases
- Daily defined doses
- International Non proprietary Names for drugs

Drug dictionaries and coding in pharmacovigilance

- WHO adverse reaction terminologies
- MedDRA and Standardised MedDRA queries
- WHO drug dictionary
- Eudravigilance medicinal product dictionary

Information resources in pharmacovigilance

- Basic drug information resources
- Specialised resources for ADRs

Establishing pharmacovigilance programme

- Establishing in a hospital
- Establishment & operation of drug safety department in industry
- Contract Research Organisations (CROs)
- Establishing a national programme

Unit III

10 Hours

Vaccine safety surveillance

- Vaccine Pharmacovigilance
- Vaccination failure
- Adverse events following immunization

Pharmacovigilance methods

- Passive surveillance – Spontaneous reports and case series
- Stimulated reporting
- Active surveillance – Sentinel sites, drug event monitoring and registries
- Comparative observational studies – Cross sectional study, case control study and cohort study
- Targeted clinical investigations

Communication in pharmacovigilance

- Effective communication in Pharmacovigilance
- Communication in Drug Safety Crisis management
- Communicating with Regulatory Agencies, Business Partners, Healthcare facilities & Media



Agarwal

Unit IV

8 Hours

Safety data generation

- Pre clinical phase
- Clinical phase
- Post approval phase (PMS)

ICH Guidelines for Pharmacovigilance

- Organization and objectives of ICH
- Expedited reporting
- Individual case safety reports
- Periodic safety update reports
- Post approval expedited reporting
- Pharmacovigilance planning
- Good clinical practice in pharmacovigilance studies

Unit V

7 hours

Pharmacogenomics of adverse drug reactions

- Genetics related ADR with example focusing PK parameters.

Drug safety evaluation in special population

- Paediatrics
- Pregnancy and lactation
- Geriatrics

CIOMS


- CIOMS Working Groups
- CIOMS Form

CDSCO (India) and Pharmacovigilance

- D&C Act and Schedule Y
- Differences in Indian and global pharmacovigilance requirements

Recommended Books (Latest edition):

1. Textbook of Pharmacovigilance: S K Gupta, Jaypee Brothers, Medical Publishers.
2. Practical Drug Safety from A to Z By Barton Cobert, Pierre Biron, Jones and Bartlett Publishers.
3. Mann's Pharmacovigilance: Elizabeth B. Andrews, Nicholas, Wiley Publishers.
4. Stephens' Detection of New Adverse Drug Reactions: John Talbot, Patrick Walle, Wiley Publishers.
5. An Introduction to Pharmacovigilance: Patrick Waller, Wiley Publishers.
6. Cobert's Manual of Drug Safety and Pharmacovigilance: Barton Cobert, Jones & Bartlett Publishers.
7. Textbook of Pharmacoepidemiology edited by Brian L. Strom, Stephen E Kimmel, Sean Hennessy, Wiley Publishers.
8. A Textbook of Clinical Pharmacy Practice -Essential Concepts and Skills: G. Parthasarathi, Karin Nyfort Hansen, Milap C. Nahata
9. National Formulary of India
10. Text Book of Medicine by Yashpal Munjal


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UNIT – III

07 Hours

- **Basic Listening Skills:** Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations
- **Effective Written Communication:** Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication
- **Writing Effectively:** Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message

UNIT – IV

05 Hours

- **Interview Skills:** Purpose of an interview, Do's and Dont's of an interview
- **Giving Presentations:** Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery

UNIT – V

04 Hours

- **Group Discussion:** Introduction, Communication skills in group discussion, Do's and Dont's of group discussion



A handwritten signature in green ink, appearing to be 'A. S. R.', located to the right of the stamp.

BP111P.COMMUNICATION SKILLS (Practical)

2 Hours / week

The following learning modules are to be conducted using wordsworth® English language lab software

Basic communication covering the following topics

Meeting People

Asking Questions

Making Friends

What did you do?

Do's and Dont's

Pronunciations covering the following topics

Pronunciation (Consonant Sounds)

Pronunciation and Nouns

Pronunciation (Vowel Sounds)

Advanced Learning

Listening Comprehension / Direct and Indirect Speech

Figures of Speech

Effective Communication

Writing Skills

Effective Writing

Interview Handling Skills

E-Mail etiquette

Presentation Skills



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Recommended Books: (Latest Edition)

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1st Edition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1st Edition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1st Edition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5th Edition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2nd Edition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1st Edition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1st Edition, Mc Graw Hill Education, 2011
11. Effective communication, John Adair, 4th Edition, Pan Mac Millan, 2009
12. Bringing out the best in people, Aubrey Daniels, 2nd Edition, Mc Graw Hill, 1999


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BP 812 ET. DIETARY SUPPLEMENTS AND NUTRACEUTICALS

No. of hours :3

Tutorial:1

Credit point:4

Scope :

This subject covers foundational topic that are important for understanding the need and requirements of dietary supplements among different groups in the population.

Objective:

This module aims to provide an understanding of the concepts behind the theoretical applications of dietary supplements. By the end of the course, students should be able to :

1. Understand the need of supplements by the different group of people to maintain healthy life.
2. Understand the outcome of deficiencies in dietary supplements.
3. Appreciate the components in dietary supplements and the application.
4. Appreciate the regulatory and commercial aspects of dietary supplements including health claims.

UNIT I

07 hours

- a. Definitions of Functional foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e. weight control, diabetes, cancer, heart disease, stress, osteoarthritis, hypertension etc.
- b. Public health nutrition, maternal and child nutrition, nutrition and ageing, nutrition education in community.
- c. Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals/functional foods: Spirulina, Soyabean, Ginseng, Garlic, Broccoli, Gingko, Flaxseeds

UNIT II

15 hours

Phytochemicals as nutraceuticals: Occurrence and characteristic features(chemical nature medicinal benefits) of following

- a) Carotenoids- α and β -Carotene, Lycopene, Xanthophylls, lutein
- b) Sulfides: Diallyl sulfides, Allyl trisulfide.
- c) Polyphenolics: Resveratrol
- d) Flavonoids- Rutin, Naringin, Quercetin, Anthocyanidins, catechins, Flavones
- e) Prebiotics / Probiotics.: Fructo oligosaccharides, Lacto bacillum
- f) Phyto estrogens : Isoflavones, daidzein, Geebustin, lignans
- g) Tocopherols
- h) Proteins, vitamins, minerals, cereal, vegetables and beverages as functional foods: oats, wheat bran, rice bran, sea foods, coffee, tea and the like.

UNIT III

07 hours

- a) Introduction to free radicals: Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids.

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- b) Dietary fibres and complex carbohydrates as functional food ingredients..

UNIT IV

10 hours

- a) Free radicals in Diabetes mellitus, Inflammation, Ischemic reperfusion injury, Cancer, Atherosclerosis, Free radicals in brain metabolism and pathology, kidney damage, muscle damage. Free radicals involvement in other disorders. Free radicals theory of ageing.
- b) Antioxidants: Endogenous antioxidants – enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, catalase, Glutathione peroxidase, Glutathione Vitamin C, Vitamin E, α - Lipoic acid, melatonin
Synthetic antioxidants: Butylated hydroxy Toluene, Butylated hydroxy Anisole.
- c) Functional foods for chronic disease prevention

UNIT V

06 hours

- a) Effect of processing, storage and interactions of various environmental factors on the potential of nutraceuticals.
- b) Regulatory Aspects; FSSAI, FDA, FPO, MPO, AGMARK. HACCP and GMPs on Food Safety. Adulteration of foods.
- c) Pharmacopoeial Specifications for dietary supplements and nutraceuticals.

References:

1. Dietetics by Sri Lakshmi
2. Role of dietary fibres and nutraceuticals in preventing diseases by K.T Agusti and P.Faizal: BSPublication.
3. Advanced Nutritional Therapies by Cooper. K.A., (1996).
4. The Food Pharmacy by Jean Carper, Simon & Schuster, UK Ltd., (1988).
5. Prescription for Nutritional Healing by James F.Balch and Phyllis A.Balch 2nd Edn., Avery Publishing Group, NY (1997).
6. G. Gibson and C.williams Editors 2000 *Functional foods* Woodhead Publ.Co.London.
7. Goldberg, I. *Functional Foods*. 1994. Chapman and Hall, New York.
8. Labuza, T.P. 2000 Functional Foods and Dietary Supplements: Safety, Good Manufacturing Practice (GMPs) and Shelf Life Testing in *Essentials of Functional Foods* M.K. Sachmidl and T.P. Labuza eds. Aspen Press.
9. Handbook of Nutraceuticals and Functional Foods, Third Edition (Modern Nutrition)
10. Shils, ME, Olson, JA, Shike, M. 1994 *Modern Nutrition in Health and Disease*. Eighth edition. Lea and Febiger





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M.PHARM. PHARMACEUTICAL ANALYSIS

COURSE STRUCTURE & SYLLABI

SEMESTER – I

S. No.	Course codes	Course Name	Hours per week			Credits
			L	T	P	
1.	21S01101	Modern Pharmaceutical Analytical Techniques	4	-	-	4
2.	21S07101	Advanced Pharmaceutical Analysis	4	-	-	4
3.	21S07102	Pharmaceutical and Food Analysis	4	-	-	4
4.	21S07103	Quality Control And Quality Assurance	4	-	-	4
5.	21S01105	Modern Pharmaceutical Analytical Techniques Lab	-	-	6	3
6.	21S07104	Pharmaceutical and Food Analysis Lab	-	-	6	3
7.	21DAC101a 21DAC101b 21DAC101c	Audit Course – I English for Research paper writing Disaster Management Sanskrit for Technical Knowledge	2	-	-	0
8.		Seminar/Assignment	-	1	6	4
		Total	18	1	18	26

SEMESTER – II

S.No.	Course codes	Course Name	Hours per week			Credits
			L	T	P	
1.	21S07201	Advanced Instrumental Analysis	4	-	-	4
2.	21S07202	Modern Bio-Analytical Techniques	4	-	-	4
3.	21SOE301a	Pharmaceutical Validation	4	-	-	4
4.	21S07203	Herbal and Cosmetic Analysis	4	-	-	4
5.	21S07204	Advanced Instrumental Analysis Lab	-	-	6	3
6.	21S07205	Modern Bio-Analytical Techniques Lab	-	-	6	3
7.	21DAC201a 21DAC201b 21DAC201c	Audit Course – II Pedagogy Studies Stress Management for Yoga Personality Development through Life Enlightenment Skills	2	-	-	0
8.	21S07206	Seminar/Assignment	-	1	6	4
		Total	18	1	18	26



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SEMESTER - III

S.No.	Course codes	Course Name	Hours per week			Credits
			L	T	P	
1.	21DRM101	Research Methodology and Intellectual Property Right	4	-	-	4
2.	21SOE301d 21SOE301f 21SOE301e	Open Electives Biological Screening methods Stability of Drugs and Dosage forms Pharmacoepidemiology and Pharmacoeconomics	3	-	-	3
3.	21S07301	Teaching Practice/Assignment	-	-	4	2
4.	21S07302	Comprehensive viva voce	-	-	4	2
5.	21S07303	Research Work - I	-	-	24	12
		Total	7	-	32	23

SEMESTER - IV

S.No.	Course codes	Course Name	Hours per week			Credits
			L	T	P	
1.	21S07401	Co-Curricular Activities	2			2
2.	21S07402	Research Work - II	3		30	18
		Total	5		30	20



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COURSE STRUCTURE & SYLLABI

Course Code	DISASTER MANAGEMENT	L	T	P	C
21DAC101b			2	0	0
Semester		I			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none"> • Learn to demonstrate critical understanding of key concepts in disaster risk reduction and humanitarian response. • Critically evaluate disaster risk reduction and humanitarian response policy and practice from Multiple perspectives. • Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations • Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in 					
UNIT - I					
Introduction: Disaster: Definition, Factors and Significance; Difference Between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude. Disaster Prone Areas in India: Study of Seismic Zones; Areas Prone to Floods and Droughts, Landslides and Avalanches; Areas Prone to Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post- Disaster Diseases and Epidemics					
UNIT - II					
Repercussions of Disasters and Hazards: Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks of Disease and Epidemics, War and Conflicts.					
UNIT - III					
Disaster Preparedness and Management: Preparedness: Monitoring of Phenomena Triggering A Disaster or Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological and Other Agencies, Media Reports: Governmental and Community Preparedness.					
UNIT - IV					
Risk Assessment Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival.					
UNIT - V					
Disaster Mitigation: Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends in Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs of Disaster Mitigation in India.					
Suggested Reading					



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COURSE STRUCTURE & SYLLABI

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies" 2. "New Royal book Company.. Sahni, Pardeep Et. Al. (Eds.), "Disaster Mitigation Experiences And Reflections", Prentice Hall Of India, New Delhi. 3. Goel S.L., "Disaster Administration And Management Text And Case Studies", Deep & Deep Publication Pvt. Ltd., New Delhi
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COURSE STRUCTURE & SYLLABI

Course Code	SANSKRIT FOR TECHNICAL KNOWLEDGE	L	T	P	C
21DAC101c			2	0	0
Semester		I			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none"> • To get a working knowledge in illustrious Sanskrit, the scientific language in the world • Learning of Sanskrit to improve brain functioning • Learning of Sanskrit to develop the logic in mathematics, science & other subjects enhancing the memory power • The engineering scholars equipped with Sanskrit will be able to explore the huge • Knowledge from ancient literature 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> • Understanding basic Sanskrit language • Ancient Sanskrit literature about science & technology can be understood • Being a logical language will help to develop logic in students 					
UNIT - I					
Alphabets in Sanskrit,					
UNIT - II					
Past/Present/Future Tense, Simple Sentences					
UNIT - III					
Order, Introduction of roots					
UNIT - IV					
Technical information about Sanskrit Literature					
UNIT - V					
Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics					
Suggested Reading					
1. "Abhyaspustakam" –Dr. Vishwas, Sanskrit-Bharti Publication, New Delhi					
2. "Teach Yourself Sanskrit" Prathama Deeksha- Vempati Kutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication					
3. "India's Glorious Scientific Tradition" Suresh Soni, Ocean books (P) Ltd., New Delhi					



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COURSE STRUCTURE & SYLLABI

Course Code	PEDAGOGY STUDIES	L	T	P	C
21DAC201a			2	0	0
Semester		II			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none"> Review existing evidence on the review topic to inform program design and policy making undertaken by the DfID, other agencies and researchers. Identify critical evidence gaps to guide the development. 					
Course Outcomes (CO): Student will be able to					
Students will be able to understand:					
<ul style="list-style-type: none"> What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries? What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners? How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? 					
UNIT - I					
Introduction and Methodology: Aims and rationale, Policy back ground, Conceptual frame work and terminology Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions. Overview of methodology and Searching.					
UNIT - II					
Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.					
UNIT - III					
Evidence on the effectiveness of pedagogical practices, Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.					
UNIT - IV					
Professional development: alignment with classroom practices and follow-up support, Peer support, Support from the head teacher and the community. Curriculum and assessment, Barrier to learning: limited resources and large class sizes					
UNIT - V					
Research gaps and future directions: Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.					
Suggested Reading					
<ol style="list-style-type: none"> Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261. Agrawal M (2004) Curricular reforms in schools: The importance of evaluation, Journal of 					



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3. Curriculum Studies, 36 (3): 361-379.
4. AkyeampongK(2003) Teacher training in Ghana - does it count? Multi-site teachereducation research project (MUSTER) country report 1. London: DFID.
5. Akyeampong K, LussierK, PryorJ, Westbrook J (2013)Improving teaching and learning of basic maths and reading in Africa: Does teacherpreparation count?International Journal Educational Development, 33 (3): 272–282.
6. Alexander RJ(2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
Chavan M (2003)ReadIndia: A mass scale, rapid, 'learning to read' campaign.
7. www.pratham.org/images/resource%20working%20paper%202.pdf.




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COURSE STRUCTURE & SYLLABI

Course Code	STRESSMANAGEMENT BY YOGA	L	T	P	C
21DAC201b			2	0	0
Semester		II			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none"> • To achieve overall health of body and mind • To overcome stres 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> • Develop healthy mind in a healthy body thus improving social health also • Improve efficiency 					
UNIT - I					
Definitions of Eight parts of yog.(Ashtanga)					
UNIT - II					
Yam and Niyam.					
UNIT - III					
Do`sand Don`t`sin life.					
i) Ahinsa,satya,astheya,bramhacharyaand aparigrahaii)					
Shaucha,santosh,tapa,swadhyay,ishwarpranidhan					
UNIT - IV					
Asan and Pranayam					
UNIT - V					
i)Variousyogposesand theirbenefitsformind &body					
ii)Regularizationofbreathingtechniques and its effects-Types ofpranayam					
Suggested Reading					
1.‘Yogic Asanas forGroupTarning-Part-I’: Janardan SwamiYogabhyasiMandal, Nagpur					
2.‘Rajayogaor conquering the Internal Nature’ by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata					



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COURSE STRUCTURE & SYLLABI

Course Code	PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS	L	T	P	C
21DAC201c		2	0	0	0
Semester		II			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none"> • To learn to achieve the highest goal happily • To become a person with stable mind, pleasing personality and determination • To awaken wisdom in students 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> • Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life • The person who has studied Geeta will lead the nation and mankind to peace and prosperity • Study of Neetishatakam will help in developing versatile personality of students 					
UNIT - I					
Neetisatakam- Holistic development of personality Verses-19,20,21,22(wisdom) Verses-29,31,32(pride & heroism) Verses-26,28,63,65(virtue)					
UNIT - II					
Neetisatakam- Holistic development of personality Verses-52,53,59(dont's) Verses-71,73,75,78(do's)					
UNIT - III					
Approach to day to day work and duties. Shrimad Bhagwad Geeta: Chapter 2- Verses 41, 47, 48, Chapter 3- Verses 13, 21, 27, 35, Chapter 6- Verses 5, 13, 17, 23, 35, Chapter 18- Verses 45, 46, 48.					
UNIT - IV					
Statements of basic knowledge. Shrimad Bhagwad Geeta: Chapter 2- Verses 56, 62, 68 Chapter 12 - Verses 13, 14, 15, 16, 17, 18 Personality of Role model. Shrimad Bhagwad Geeta:					
UNIT - V					
Chapter 2- Verses 17, Chapter 3- Verses 36, 37, 42, Chapter 4- Verses 18, 38, 39 Chapter 18- Verses 37, 38, 63					
Suggested Reading					
1. "Srimad Bhagavad Gita" by Swami Swarupananda Advaita Ashram (Publication Department), Kolkata					
2. Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P. Gopinath, Rashtriya Sanskrit Sansthanam, New Delhi.					





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1.3.1

**List of activities related to the
Professional Ethics, Gender,
Human Values, Environment and
Sustainability (2017-2022)**




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List of Activities for AY-2017-18

S.No	Name of the activity	Category	Date
1	Harithaharam	Environment	14-07-2017
2	Free medical camp	Professional Ethics	01-08-2017
3	Swatch campus	Environment	03-10-2017 to 06-10-017
4	Maa oori program	Human Values	10-11-2017
5	World cancer day	Professional Ethics	04-02-2018
6	Free medical camp	Professional Ethics	12-03-2018
7	Swatch bharath	Environment	13-03-2018-15-03-2018
8	Neeru – chettu	Environment	14-03-2018
9	Tuberculosis day	Professional Ethics	24-03-2018
10	Water value discussion	Environment	10-04-2018
11	Jalayagnam	Environment	13-04-2018
12	World malaria day	Professional Ethics	25-04-2018




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List of Activities for AY-2018-19

S.No	Name of the activity	Category	Date
1	Free medical camp	Professional Ethics	01-07-2018
2	Botanical tour	Professional Ethics & Environment	12-08-2018
3	World blood donors day	Professional Ethics	01-10-2018
4	Swatch bharath	Environment & Human Values	3-10-18 to 6- 10- 2018
5	Maa oori programm (Expo)	Human Values	10-11-2018
6	World Diabetes Day	Professional Ethics	14-11-2018
7	APSPF team cycle rally	Human Values & Sustainability	23-12-2018
8	Pharmacy-A Healthy India	Professional Ethics	04-01-2019
9	World cancer day	Professional Ethics	04-02-2019
10	Tuberculosis day	Professional Ethics	24-03-2019
11	World malaria day	Professional Ethics	25-04-2019
12	World environment day	Professional Ethics	05-06-2019




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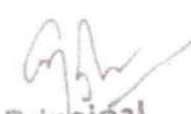
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List of Activities for AY-2019-20

S.No	Name of the activity	Category	Date
1	Botanical tour	Professional Ethics & Environment	29-09-2019
2	World blood donors day	Professional Ethics	01-10-2019
3	World diabetes day	Professional Ethics	14-11-2019
4	Cricket tournament	Human Values	04-01-2020
5	National wide bench press	Human Values	10-01-2020
6	Skill development programm	Professional Ethics	20-01-2020
7	National voters day	Human Values	24-01-2020
8	Industrial tour	Professional Ethics	27-01-2020 to 28-01-2020
9	World cancer day	Professional Ethics	04-02-2020
10	Mega dental camp	Professional Ethics	24-02-2020
11	Sanitizers preparation and distribution (covid)	Professional Ethics	28-03-2020 to 31-03-2020
12	World environment day	Environment	05-06-2020


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List of Activities for AY-2020-21

S.No	Name of the activity	Category	Date
1	World diabetes day	Professional Ethics	14-11-2020
2	Mega test camp (covid 19)	Professional Ethics	06-01-2021
3	SRCP students Expo	Professional Ethics	7-1-2021
4	World cancer day	Professional Ethics	04-02-2021
5	World tuberculosis day	Professional Ethics	24-03-2021
6	National cerebral palsy day	Professional Ethics	25-03-2021
7	Graduation day	Human Values	27-03-2021
8	World health day	Professional Ethics	07-04-2021
9	World traditional day	Human Values	08-04-2021
10	World homeopathy day	Professional Ethics	10-04-2021
11	Skill development program	Professional Ethics	11-04-2021
12	World parkinsonism disease	Professional Ethics	11-04-2021
13	World earth day	Environment	22-04-2021
14	World environment day	Environment	05-06-2021
15	Natural immunity booster	Professional Ethics	17-06-2021




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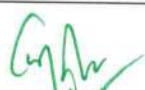
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List of Activities for AY-2021-22

S.No	Name of the activity	Category	Date
1	Swachath pakwada	Environment	01-08-2021 to 15-08-2021
2	Vaccination campaign	Professional Ethics	07-08-2021
3	Vaccination campaign	Professional Ethics	13-09-2021
4	Anti plastic awareness campaign	Professional Ethics	23-10-2021
5	Anti plastic awareness campaign	Professional Ethics	25-10-2021
6	Skill development programme	Professional Ethics	09-11-2021
7	World diabetes day	Professional Ethics	14-11-2021
8	National pharmacy week	Professional Ethics	22-11-2021 to 27-11-2021
9	AIDS day	Professional Ethics	01-12-2021
10	ALUMINI DAY	Human Values	08-01-2022
11	National voters day	Human Values	25-01-2022
12	World cancer day	Professional Ethics	04-02-2022
13	Azadi ka amruth mahostav	Professional Ethics	07-02-2022
14	Fresher's day	Human Values	12-03-2022
15	World tuberculosis day	Professional Ethics	24-03-2022
16	World no tobacco day	Professional Ethics	31-05-2022




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