1. EDITORIAL BOARD

Chairman	:	Sr. Alphonsa. P Secretary / Correspondent
Editor-in-Chief	:	Dr. Sk. Abdul Rahaman, Principal
Editor	:	Mr. T. Joshi Anand
Associate Editors	:	Dr. A. Rajendra Prasad Mrs. G. Swapna
Assistant Editors	:	Mr. R. Naresh Babu Mrs. R. Ratna Manjula Mr. Sk. Liakhat Ali

2. VISION & MISSION

Vision: "Shaping the Pharmacists with scientific Aptitude and Social Consciousness".

Quality consciousness, Creativity, Innovation, Sensitivity and Services are the wheels of the Institution. The combination of these values are the defining characteristics of the Institution. The College aspires to bring in holistic development of the students with integrated values aiming to excel in every field. We believe Educational Institutions have multiple roles to play. Hence Nirmala develops a Scientific mind with social consciousness preparing the student a complete and perfect Pharmacist.

Mission: "Integrity Through Teaching, Learning with Love and Service".

The statement of our mission comes from the College motto "Love and Service" which calls us to the holistic development of the person with integrated values aiming to excel in every field. Nirmala College of Pharmacy focuses on seeking God in all things and working to expand knowledge in the service of humanity through learning Pharmaceutical Sciences with faith and trust.

3. BRIEF HISTORY OF THE MANAGEMENT

Nirmala College of Pharmacy (NCPA) is established and administered by the society of Catechist Sisters of St. Ann, Hyderabad under the article 30(1) according to the constitution of India. The society was founded in 1914 in Nalgonda Dist, Andhra Pradesh by Rev. Fr. Silvio Pasquali. The Objectives and Mission of the Society is to eradicate the poverty, social injustice, oppression and ignorance among rural masses. The Management is extending its services in Andhra Pradesh, Telangana, Karnataka, Tamilnadu, Kerala in India, and in Italy, Tanzania of North Africa. It is administering 75 Educational Institutions including 11 colleges, 35 hostels, 10 hospitals, 10 social service centers, 01 home for the aged, 01 home for street children, 01 day care center, 01 home for physically challenged, 65 old age support schemes and 34 charitable projects. Over all 60,000 students are being catered in their Educational Institutions.

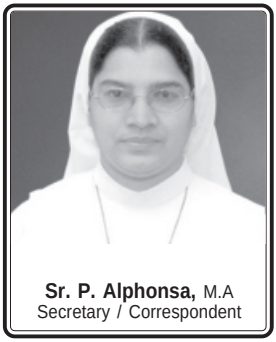
4. GOVERNING BODY

Sr. Rosamma N.P.
M.Sc., B.Ed
President/Superior General

Sister Rosamma N.P M.Sc., B.Ed. is a Roman Catholic Religious nun. She has experienced in running a number of Primaries, upper primary and High Schools, Junior Colleges, Degree and Post-Graduation College, School and College of Education Centers, Industrial Training School, Hospitals and Health care centers in the field of academic area. She visited several Countries and has various educational system of Knowledge. She has more than 35 years of experience. She worked as the Principal of various educational institutions and has vivid contacts with the foreign countries.

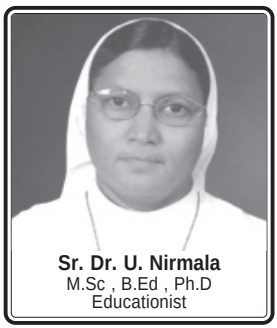
Sr. Dr. Innamma Mekala
M.B.B.S., D.G.O
Vice President/ Vicar General

Sister Dr. Innamma Mekala M.B.B.S., D.G.O is a Roman Catholic nun and she has the experience in hospital administration, Public relation and running Various hospitals and Health care, H.I.V AID control and Social service centers. She conducts free eye camps and arranges various health care programmes in the Society. She excels in Knowledge and public relationship with the Pharmaceutical industries in the state, National and international level. She is the Directress of Education Institutions in the Society.



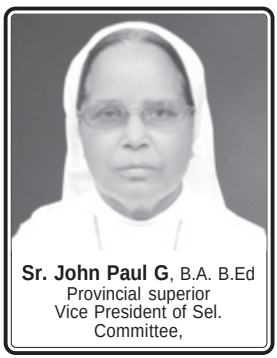
Sr. P. Alphonsa, M.A
Secretary / Correspondent

Sister P. Alphonsa, M.A is a Roman Catholic nun, and she has the experience in running various educational institutions as head of the institutions and she attended the No. of National Seminars and workshops, symposia etc. She is a dynamic and efficient administrator. She has been holding the post of Secretary/ Correspondent of Nirmala College of Pharmacy since 2012.



Sr. Dr. U. Nirmala
M.Sc , B.Ed , Ph.D
Educationist

Sister Dr.U.Nirmala is a Roman Catholic nun, she holds the key post of educational institutions in the Society. She has a Good rapport and vast experience in running Degree, Post graduate Professional Colleges in the Society. She did her Doctorate in Science. She maintains good rapport with the universities in A.P. She also works as the Secretary of our Educational Institutions in our Society.



Sr. John Paul G, B.A. B.Ed
Provincial superior
Vice President of Sel.
Committee,

Sister John Paul G is a Roman Catholic nun, is selected as the vice president of the selection committee of Nirmala College of Pharmacy. She has the experience of administering the schools, public relations. She has vast knowledge in Educational field. She holds the key post in our Educational institutions and sees to the smooth functioning of the institutions.

5. PROFILE OF THE COLLEGE

Nirmala College of Pharmacy is a self financed institution, affiliated to Acharya Nagarjuna University, Guntur, Andhra Pradesh and is approved by AICTE & PCI, New Delhi. The College was established in 2004 with Diploma in Pharmacy and it has started Bachelor of Pharmacy course in 2006. The Master of Pharmacy with two specializations of Pharmaceutics and Pharmaceutical Analysis were started in 2010 and M. Pharmacy Pharmacology was started in 2011. Pharm D course was opened in the year- 2013.

The serene college campus is spread over in 3.5 acres of land. The Lectures are held in a two multistoried buildings in well established class rooms with e-teaching, digital library, well equipped laboratories and in addition to that Animal house built as per CPCSEA guidelines. The facilities are provided for indoor and outdoor games.

The College has a very good team of committed and qualified teaching staff consisting of 30 members among whom five Doctorates in Pharmacy and many others have registered for Ph.D.

The College has earned name and fame for its high academic excellence, discipline, promoting the moral and social values which help in the integrated growth of the students.

6. COURSES OFFERED

- **M. Pharmacy** **(2 Years)**
  - Pharmaceutics (24 seats)
  - Pharmaceutical Analysis (24 seats)
  - Pharmacology (18 seats)

- **B. Pharmacy** **(4 Years)**
- **Pharm D** **(6 Years)**
- **D. Pharmacy** **(2 Years)**

7. ELIGIBILITY, ADMISSION PROCESS & FEE STRUCTURE

D. Pharmacy :

Duration of Course	:	2 years
Number of seats	:	60
Eligibility	:	10 + 2 (M.P.C / Bi.P.C)
Tuition fee	:	Rs. 17,000/- (Seventeen thousand rupees only)

B. Pharmacy :

Duration of Course	:	4 years
Number of seats	:	100 Counseling (70%) - 70 (35 for M.P.C & 35 for Bi.P.C); Management quota (30%) - 30 seats
Eligibility		: 10 + 2 (M.P.C / Bi.P.C) / D. Pharmacy
Tuition fee		: Rs. 40,000/- (Forty thousand rupees only)

M. Pharmacy :

Duration of Course	:	2 years
Number of seats	:	66 Pharmaceutics-24, Pharm.Analysis-24, Pharmacology-18 Counseling (70%) & Management quota (30%)
Eligibility	:	B.Pharmacy through GPAT / PGECET ranks
Tuition fee	:	Rs. 1,10,000/- (One lakh ten thousand rupees only)

Pharm D :

Duration of Course	:	6 years
Number of seats	:	30 Counseling (70%) - 21 (10 for M.P.C & 11 for Bi.P.C); Management quota (30%) - 09 seats
Eligibility	:	10 + 2 (M.P.C / Bi.P.C)
Tuition fee	:	Rs. 68,000/- (Sixty eight thousand rupees only)

8. TEACHING STAFF

S. No.	Name of the Faculty	Qualification	Designation
1.	Dr. SK. Abdul Rahaman	M.Pharm, PhD	Principal/Professor
2.	Dr. K. Shantha Kumari	M.Tech, PhD	Professor
3.	Dr. D. Subba Reddy	M.Pharm, PhD	Professor
4.	Dr. A. Rajendra Prasad	M.Pharm, PhD	Professor
5.	Dr. M. Anjana	M.Pharm, PhD	Professor
6.	P.L. Harold Peter	M.Pharm	Professor
7.	R Naresh Babu	M.Pharm (PhD)	Associate Professor
8.	Ch Supriya	M.Tech (PhD)	Associate Professor
9.	R. Ratna Manjula	M.Pharm	Associate Professor
10.	U. Spanadana	M.Pharm (PhD)	Associate Professor
11.	Goday Swapna	M.Pharm (PhD)	Associate Professor
12.	Sowjanya Kattupalli	M.Pharm (PhD)	Associate Professor
13.	T. Joshi Anand	M.Pharm	Asst. Professor
14.	Sudheer Maddela	M.Pharm (PhD)	Asst. Professor
15.	T. Vani	M.Pharm (PhD)	Asst. Professor
16.	Maddu Prasanthi	M.Pharm	Asst. Professor
17.	Shaik Munwar	M.Pharm	Asst. Professor
18.	Shiak Liakhat Ali	M.Pharm (PhD)	Asst. Professor
19.	Dr. Sri Vidhya	Pharm D (PB)	Asst. Professor
20.	Swati Srungarapati	M.Pharm	Asst. Professor
21.	M. Rajendra	M.Pharm	Asst. Professor
22.	Sr. Nirmala Jyothi	M.Pharm	Asst. Professor
23.	K. Dilip Raja	M.Pharm	Asst. Professor
24.	M.S.R. Murthy	B.Pharm, M.B.A	Asst. Professor
25.	Lakshmi Santha M	M.Pharm	Asst. Professor
26.	P. Ashok Kumar	MCA	Lecturer
27.	G. Venkata Anjaneyulu	M.Sc.	Lecturer
28.	P. Srinivasa Rao	M.Sc., M. Phil	Lecturer
29.	D. Ramesh	B. P.Ed	Physical Director
30.	S. L. Narayana	M.A	Lecturer
31.	V V N Durga Rani	M.A, M.Li.Sc	Librarian
32.	G. Mahalakshmi	M.A, C.Li.Sc	Librarian

9. COMMITTEES

9.1 CLASS INCHARGES

Course Name	Class Teachers
D. Pharm (1st year)	Mrs. M. Prasanthi
D. Pharm (2nd year)	Mr. M. S. R. Murthy
Pharm D (1st year)	Mr. T. Joshi Anand
Pharm D (2nd year)	Mr. P. L. Harold Peter
B. Pharm(1st year)	Mrs. R. R. Manjula & Mr. SK. Munwar
B. Pharm(2nd year) I SEM	Mrs. Ch. Supriya
B. Pharm(2nd year) II SEM	Mrs. U. Spandana
B. Pharm(3rd year) I SEM	Mr. R. Naresh Babu
B. Pharm(3rd year) II SEM	Mrs. Ch. Supriya
B. Pharm(4th year) I SEM	Mrs. G. Swapna
B. Pharm(4th year) II SEM	Mrs. G. Swapna
M. Pharm(Ceutics)	Dr. A. Rajendra Prasad
M. Pharm(Analysis)	Prof. Dr. A. Shantha Kumari
M. Pharm(Cology)	Prof. Dr. D. Subba Reddy

9.2 COMMITTEE MEMBERS

NSS	Sr. Alphonsa. P Mr. R. Naresh Babu Mrs. K. Sowjanya Mr. K. Dilip Raja
Scientific	Prof .Dr. S. A. Rahaman Prof. Dr. A. Shanta Kumari Prof. Dr. M. Anjana Mrs. G. Swapna Mr. Sk. Likhat Ali Mr. K. Dilip Raja

Exam Cell	Prof .Dr. S. A. Rahaman Mrs. U. Spandana Sr. Nirmala Jyothi Mr. Sk. Subhani
Discipline/Prayer	Prof. Dr. A. Rajendra Prasad Mrs.Ch. Supriya Mr. T. Joshi Anand Mr. Sk. Likhat Ali Ms. S. Swathi
Sports & Cultural	Prof. Dr.D. Subba Reddy Mrs. R.R. Manjula Mr. T. Joshi Anand Mrs. K. Sowjanya Mr. SK. Munwar Dr. Sri Vidhya Mrs. T. Vani
Press/Publicity/ CD Writing, Drafting, Flexes	Mr. R. Naresh Babu Mr. M.S.R Murthy Mr. M. Sudheer Mr. P. Ashok Kumar
Placements	Prof. Dr. S.A. Rahaman Prof. Dr.D.Subba Reddy Mr. T.Joshi Anand Mr. M.S.R.Murthy Mr. Sk. Likhat Ali
Anti Ragging	Prof. Dr. A. Rajendra Prasad Mr. P. L. Harold Peter Mrs.Ch. Supriya Mr. M. Sudheer Ms. S. Swathi Mr. K. Dilip Raja

10. COLLEGE SERVICES

1. LIBRARY

It is a treasure house of knowledge providing valuable information to students, faculty and research scholars. There has been a consistent growth in the collection of books at library. Today the library houses more than 5911 volumes of books consisting of around 1060 titles.

The book's cover various subjects like Pharmaceutical Chemistry, Pharmaceutical Analysis, Pharmaceutical Biotechnology, Pharmaceutics, Pharmacology, Pharmacognosy, Hospital Pharmacy, Pharmacy Practice, etc., The library has been subscribing 38 National and International journals as print and online in the field of Pharmaceutical sciences. Library also providing the e-learning facility to the students and faculty members.

Working Hours	:	8:30 AM to 6:00 PM
Total volumes	:	5911
Total titles	:	1060
e- Journals	:	38
Printed journals	:	25

2. SMART CLASS ROOMS

Classrooms are well equipped with LCD Projector, computer and audiovisual system to teach / guide the students.

3. WELL EQUIPPED PHARMACEUTICAL LABORATORIES

The college has a total no. of 20 laboratories to train the students in the departments of Pharmaceutical chemistry, Pharmaceutical biotechnology, Pharmaceutical analysis, Pharmaceutics, Pharmacology, Pharmacy Practice, Pharmacognosy, etc.,

List of Major Equipment available :

1. HPLC (High performance Liquid Chromatography)
2. UV-Visible spectrophotometers (Double beam & single beam)
3. Dissolution apparatus
4. Spectro fluorimeters
5. Soxhelet extractors
6. Flame Photometers
7. BOD incubator
8. Orbital Shake incubator
9. Cooling Centrifuges
10. Laminar air flow
11. Colony counter
12. Rota rod apparatus
13. Plethesmograph
14. 16 stage Tablet punching machine
15. Projection microscope
16. Rota Evaporator
17. Vacuum drier
18. Histamine chamber

19. Fluidized Bed drier
20. Bioanalyzer
21. Gel Electrophoresis
22. Paper Electrophoresis
23. Sterility Testing apparatus
24. Brook field viscometer
25. Disintegration test apparatus
26. 0.1 mg digital balances, etc.,

4. RESEARCH FACILITIES

The college is providing a perfect ambience for the pursuit of excellence in Pharmacy Education and Research.

5. ANIMAL HOUSE :

CPCSEA, New Delhi approved animal house for conducting experiments on animals.

6. CONFERENCE HALL :

The conference hall is well equipped with LCD and Audio Visual System.

7. AUDITORIUM :

The auditorium has a capacity of 600 people to organize seminars, conferences, cultural and public programmes.

8. PERSONALITY DEVELOPMENT PROGRAMMES

The main goal of the personality development center is to provide students with a cohesive and integrated Personality Development Program which improves communication and leadership skills of the students.

9. CAREER GUIDANCE & PLACEMENT DRIVES

The placement and consultancy cell guides the students about their career. The placement cell interacts with industrial representatives and organizes interviews for campus drive to the students from Pharmaceutical companies, Hospitals, Software companies, Educational Institutions, etc.,

10. NSS UNIT

The NSS unit of our college provides a platform for community service and caters to those students who have inclination to develop as "not me but you". The NSS volunteers actively participate in programmes like blood donation camp, free medical check-up, educating the government school children, Clean and green program, Swatcha Bharat and planting trees for a green environment.

11. CAFETERIA

College has a spacious canteen with hygienic environment which provides quality food and prompts service and caters to needs of all the students and the staff. There is a wide variety of cuisine and the students enjoy the pleasure of eating during the breaks. Cool aqua water for drinking is available.

12. COMPUTER LAB & PHOTOCOPY

The college provides Wi-Fi facility with huge number of computers in the lab. Photocopying facility helps the students to equip themselves with reference from library, question papers, journals and other necessary documents.

13. GIRLS HOSTEL

Girl's hostel is within the campus with well furnished rooms and modern amenities. The overall atmosphere is very conducive for the students to concentrate on studies. Generators have been provided as power back up.

Emphasis has been laid on hygiene and cleanliness for healthy living. A customized menu caters to the student needs and it keeps changing according to their tastes.

14. GAMES, SPORTS & CULTURAL ACTIVITIES

The importance of sports and games is being increasingly recognized in India, from both the educational and social points of view. In view of this we are encouraging the students and also faculty members to participate in sports & Games meet in our institution.

The importance of social and cultural activities in preparing students for real life and strengthening their personal skills cannot be questioned. Student life within the college is rich and a wide range of activities are present to tailor all talents and interests. As social and cultural activities are of paramount importance, the college encourages all extra-curricular activities that are both in line with the educational objectives of the institution and meet the needs of the students.

15. PARENTS- FACULTY MEET

Parents are welcome to meet the in-charge faculty and the concerned subject teacher to discuss and review the progress of the students. They meet at least thrice a year. Parents and teachers also exchange their views and ideas in shaping the future of their children.

16. GOVERNMENT SCHOLARSHIPS

Government scholarships are available for eligible students to study their Pharmacy program in our institution.

11. COLLEGE RULES & REGULATIONS

- Life in college starts with Prayer at 9:15 AM
- The College functions from 9:15 AM - 4:30 PM (Lunch Break 12:50 PM - 1:40 PM)
- The students are expected to be regular in attending the classes and tests.
- Students who are unable to attend the classes due to illness or any other genuine reason are expected to submit a leave letter to the Principal.
- All the students should attend the college with uniform during working days except Saturdays.
- All the students should wear ID cards throughout the day.
- The students are expected to dress up in simple and decent manner, which conformed to the standards of modesty. Sleeveless, shorts, jeans and tight garments are not allowed.
- The students should behave politely and respectfully to all faculty and other staff members of the College.
- Students should be regular and punctual to the classes and other activities.
- No student is allowed to carry the Cell Phones in the campus.
- Ragging is totally prohibited in the College.
- The students are expected to safeguard the College property.
- The College authorities are not responsible for the belongings of the students.

12. B. PHARMACY COURSE RULES & REGULATIONS

01. Attendance Requirements:

A regular course of study during an academic semester means a minimum of average attendance of 75% of all the courses of the semester computed by totaling the number of periods of lectures and practical's, as the case may be, held in every course. In special cases where sufficient causes were shown, the Vice- Chancellor may on the recommendation of the Principal concerned condone the deficiency in the average attendance to an extent of 10% for reasons such as ill health, if the application for condonation is submitted at the time of actual illness and is supported by certificate of authorized Medical Officer approved by the Principal.

However, in the case of students, who participate in activities like N.S.S., N.C.C., Inter-Collegiate tournaments conducted by Acharya Nagarjuna University, Inter-University tournaments conducted by Inter-University Board and any such other activities involving the representation of the College/ University with the prior approval of the principal, the candidate maybe deemed to have attended the college during the period solely for the purpose of the examination.

i) A candidate who cannot satisfy the attendance requirements in clause 01 because of late admission under special circumstances reasonable and acceptable to the University on the basis of document, shall fulfill the following conditions: Average attendance : A candidate shall have attended at least a total of 90% of the periods-lectures / practicals as the case may be held from the date of admission and also shall attend at least 50% of

the total working days during that academic semester (Late admission means, admissions made after 45 days from date of commencement of the academic semester for the course).

ii. If any candidate fails to satisfy the regulation under 02 or 03 she / he shall not be allowed for the university Examinations at the end of the semester, and he / she shall not be allowed for promotion to the next higher class of study. He / she shall be required to repeat the regular course of study of that academic semester along with the next regular batch.

02. **Examinations:** Assessment for the award of degree shall consists of (a) internal evaluation for 30 marks in each of the theory and practical courses separately as detailed in the scheme of examination. (b) Semester-end examination as detailed in the scheme of examination for 70 marks in each of the theory and practical.

i. Regulations concerning sessional examinations

(a) There shall be 3 sessional examinations in each theory subject and the best of the two average shall be taken for 1st Year Annual Exams where as from 2nd Year onwards there shall be 2 sessional examinations in each theory subject and the best of one shall be taken.

(b) The marks for the internal evaluation for the practical are awarded based on the continuous assessment of the performance of the candidate at the practical classes and the records. The marks certificate issued to the candidate by University shall show separately the sessional marks, the semester-end examination marks and the aggregate of both.

(c) The teacher who teaches the subject shall ordinarily be internal examiner.

(d) There shall be no provision for the improvement of the sessional marks.

ii. Regulations concerning semester-end examination:

(a) There shall be one semester-end examination in each theory course based on the question paper set by an external paper setter and it shall be evaluated by an internal examiner. There shall be one semester-end examination in each practical course. The duration of the practical examination may be of 4 to 6 hours as prescribed. There shall be supplementary examinations for all the semesters. A Student shall be eligible for promotion to III B. Pharmacy course if he / she has passed all but 3 subjects of I B.Pharmacy (I & II semesters put together including practical subjects) in addition to satisfying the minimum requirement of attendance.

b) A student shall be eligible for promotion to IV B.Pharmacy course if he / she has satisfied the minimum requirement of attendance in III B.Pharmacy and has passed all but 3 subjects of II B.Pharm (3^{rd} & 4^{th} semesters put together) and passed all but 1 subject of I B.Pharmacy.

c) Choice based credit system in B.Pharmacy courses are implemented from 2013-14.

d) 70-30 marks system implemented (w.e.f. 2013-14 Academic Year) i.e., 70 marks in each of the theory and practical courses separately in semester end exams and 30 marks in each of the theory and practical courses separately in sessional examinations for B.Pharmacy course.

iii. A candidate shall be declared to have passed the examination in each semester if he obtains (i) not less than 40% marks in each theory and 40% in each practical of the semester-end examinations in addition to 50% aggregate including theory and practicals of internal and annual or semester examinations.

iv. **B pharmacy credit based grading system - rules & regulations :** A student has to secure a minimum of 'E' grade in each paper and also a minimum of SGPA (Semester Grade Point Average) of '6' points (D-grade) out of '10' points (O-grade) if the student fails to secure minimum SGPA of 6 points the studetn has to reappear for all the papers where he / she got 'E' grade to secure minimum 'D' grade in that respective paper.

CREDIT SYSTEM REGULATIONS

Credits are awarded for each theory/practical subjects. Each theory subject is awarded 4 credits and each practical subject is awarded 2 credits project work is awarded 10 credits however for some important theory subjects more than 4 credits may be awarded by individual boards. A total number of credits for all the four years put together is 218-224.

S.No	Range of Marks	Grade letter	Grade point
1.	$\geq$ 75 and $\leq$ 100	O	10
2.	$\geq$ 65 and $\leq$ 74	A	9
3.	$\geq$ 60 and $\leq$ 64	B	8
4.	$\geq$ 55 and $\leq$ 59	C	7
5.	$\geq$ 50 and $\leq$ 54	D	6
6.	$\geq$ 40 and $\leq$ 49	E	5
7.	$\leq$ 39	F	Zero
8.	Absent / NR	W	-

v. A candidate may be permitted to improve his performance in semester-end examination of any semester only after completing the entire eight semester course of study by appearing again for the whole examinations of that semester only during four subsequent years after completion of the study of the entire course. Such an improvement can be availed only once for each one of the semester examinations of the entire course of study. When considered in its totality the better of the two performances as whole at the I, II, III, IV, V, VI, VII or VIII semesters as the case may be shall be taken into consideration for the purpose of awarding the grade.

vi. The courses 101 (A) Mathematics, 101 (B) Biology Theory and 101 (C) Biology Practicals are bridge courses for candidates with only biology and with only mathematics background respectively at the intermediate level.

vii. Any candidate who carried a backlog at any stage will not be eligible for rank, medal or prizes to be awarded by the University. First attempt means appearance at the first examinations conducted for the particular batch.

03. Industrial Training:

Every candidate shall undergo practical training for at least one month in Pharmaceutical factory / Pharmaceutical concern / hospital / clinical lab at the end of the final semester of the course.

13. SYLLABUS

For B. Pharmacy

I/IV B.PHARMACY (1st & 2nd SEMESTERS)

101 A MATHEMATICS (75 hrs.)

Unit : 01

ALGEBRA: Arithmetic progression-Geometric Progression-Permutations and Combinations-Binomial theorem–Partial functions-Matrices- Determinants-Application of determinants to solve simultaneous equations (Cramer's Rule)

Unit : 02

CO- ORDINATE GEOMETRY: Distances between two points – Area of a Triangle, Co-ordinates of a point dividing a given segment in a given ratio-locus-equation to a straight line in different forms –Angle between straight lines –Point of intersection.

Unit : 03

DIFFERENTIAL CALCULUS:

Limit of a function, derivative of a function, Differentiation of a sum, Product and quotient, Differentiation of composite functions, Implicit functions, parametric functions, Logarithmic differentiation, differentiation of exponentials.

Unit : 04

CONTINUITY AND LIMIT: Differentiation, derivability and derivative, R.H. derivatives and L.H. derivatives, differentiations. General theorems of derivation. Derivatives of trigonometric functions (excluding inverse trigonometric and hyperbolic functions). Logarithmic differentiation. Partial differentiation maxima and minima (elementary)

Unit : 05

INTEGRAL CALCULUS: Integration as inverse process of differentiation, definite integrate integration by substitution, integration by parts, integration of Algebraic function of evaluation of area in simple cases.

Unit : 06

DIFFERENTIAL EQUATIONS: Formation of differential equation, order and degree, derivation of a differential equation.Introduction to Laplace transforms and their use.

TEXT BOOKS

1.	Differential Calculus	:	Shantinarayan
2.	Integral Calculus	:	Shantinarayan
3.	Engineering Mathematics	:	Grewaf
4.	Intermediate Mathematics	:	V.Venkateswara Rao N.Krishnamurthy B.V.S.S.Sarma
5.	Differential Equations and their applications	:	Jafar Ahsan

I/IV B.PHARMACY (1st & 2nd SEMESTERS)

101 B BIOLOGY (Theory) (50 hrs.)

Unit : 01

Living and non-living organisms and their differences, Plants and animals differences; Cell structure, Cell inclusions. Mitosis in animals and Meiosis in animals.

Unit : 02

Classification of plant kingdom and salient features of different groups only. Structure and life history of Bacteria and Yeast.

Unit : 03

Taxonomic Families : Solanaceae and Umbelliferae.

Unit : 04

Root (taproot and fibrous roots and their functions only), Stem, Leaf (Vegetative morphology), Flower, Inflorescence (Reproductive morphology), Anatomical structures of root, stem (Monocot and Dicot), Root and Fruit (Types of fruit); seed formation; pollination (different types of pollinating agents) and types of pollination methods.

Unit : 05

Classification of animal Kingdom; Invertebrates, vertebrates and their salient features only. Structure and physiology of Amoeba, Paramecium and Earthworm (locomotion, digestive, excretory and reproductive systems only).

Unit : 06

Parasitology: Introduction, Entamoeba, Plasmodium, Trypanosoma and Ascaris (Structure and Life history only).

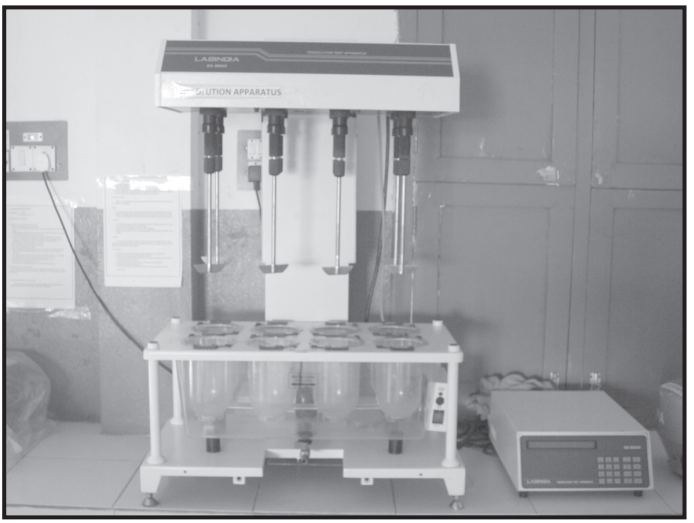
I/IV B.PHARMACY (1st & 2nd SEMESTERS)

101 C BIOLOGY (Practicals) (50 hrs.)

01. Care and use of the Microscope
02. Technical description of plants belonging to the Angiosperms families prescribed in the syllabus and referring them to their respective families.
03. Microscopic study of different tissues and the primary anatomical structure of a root, stem and leaf.(Monocot & Dicot)
04. Microscopic and macroscopic examination and identification of the types prescribed in the syllabus.
05*. Dissection in Earthworm, (Digestive & Nervous systems)

TEXT BOOKS

1.	A class book of Botany	:	A.C.Dutta
2.	Outlines of Zoology	:	Ekkambarnath Iyer
3.	A text book of Vertebrate Zoology	:	S.N.Prasad
4.	A text book of invertibrates	:	N.C.Nair
5.	Intermediate Academy text books of		Botany & Zoology



DISSOLUTION APPARATUS

I/IV B.PHARMACY (1st & 2nd SEMESTERS)

102 PHRAMACEUTICAL CHEMISTRY–I (ORGANIC-I)

(Theory) (75 hrs.)

Unit : 01

Structure and Properties :

a. Characteristic features of covalent bond, hydrogen bond, intermolecular forces, hybridisation.

b. Reactive intermediates : Free radicals, carbocations and carbanions

c. Electron displacement effects : Inductive effect, electromeric effect, resonance and hyperconjugation effects.

d. Attacking reagents : Electrophiles and nucleophiles.

Unit : 02

Chemistry of Hydrocarbons :

a. Nomenclature and general methods to prepare alkanes, alkenes, alkynes and cycloalkanes.

b. Free radical chain rections of alkanes - mechanism, relative reactivity and stability.

c. Electrophilic addition : Reactions at carbon-carbon double bond, hydrogenation, Markovnikov's rule, addition of hydrogen halides, addition of hydrogen bromide, peroxide effect, electrophilic addition mechanism, cycloaddition, ozonolysis reactions, addition of carbenes to alkenes and glycol formation reaction.

d. Addition of hydrogen halides and water to alkynes, polymerisation reaction and acidity of alkynes.

e. Bayer's strain theory of strainless rings.

f. Stability of conjugated dienes, mechanism of 1, 2 and 1, 4-additions with examples, effect of temperature on 1, 2 and 1, 4- addition to dienes.

Unit : 03

Chemistry of Alcohols and Ethers

a. Nomenclature and general methods to prepare monohydric alcohols and ethers.

b. Classification and isomerism in alcohols and ethers.

c. Oxidation of alcohols, reaction of alcohols with metals and phosphrous trihalides and chemical tests to distinguish alcohols, dehydration of alcohols and its mechanism, orientation and reactivity in E2 and E1. reactions, Satyzeff's and Hoffmann's elimination.

d. Brief account of absolute alcohol and Rectified spirit.

e. Cleavage of ethers by acids, mechanism of Williamson's synthesis.

Unit : 04

Chemistry of alkyl halides :

a. Nomenclature and general methods to prepare alkyl halides.

b. Nucleophilic aliphatic substitution : Mechanism and stereochemistry of SN1 and SN2 reactions, SN2 vs SN1 reactions, reactivity of alkyl halides in SN1 and SN2 reactions and factors affecting SN1 and SN2 reaction.

Unit : 05

Chemistry of Carbonyl compounds :

a. Classification, nomenclature and general methods to prepare carbonyl compounds

b. Nucleophilic addition in aldehydes and ketones, mechanism with examples (addition of sodium bisulphite, hydrogen cyanide, alcohols, Grignard reagent and ammonia derivatives), Mechanism of Aldol condensation, crossed aldol condensation, cannizaro's reaction, reformatsky reaction, perkin reaction and Benzoin condensation.

Unit : 06

Chemistry of carboxylic acids and acid derivatives :

a. Nomenclature and general methods to prepare carboxylic acids, acid chlorides , acid amides and esters.

b. Nucleophilic acyl substitution in carboxylic acid derivatives, comparision with nucleophilic addition reaction, acidity of carboxylic acids, effect of substitutents on acidity, HVZ reaction, conversion of acids to acid chlorides, amides, esters and anhydrides, acidic and alkaline hydrolysis of esters, esterification and Claisen condensation reactions.

c. Preparation and synthetic uses of acetoacetic and malonic esters.

"Cleanliness is next to godliness."

I/IV B.PHARMACY (1st & 2nd SEMESTERS)

103 PHRAMACEUTICAL CHEMISTRY – II (ORGANIC-I)

(Practicals) (75 hrs.)

01. Determination of melting point.
02. Determination of boiling point.
03. Demonstration of various filteration techniques.
04. Demonstration of various crystallisation techniques
05. Synthesis of benzoic acid by hydrolysis of Benzamide.
06. Synthesis of dibromo cinnamic acid from cinnamic acid.
07. Synthesis of dibenzal acetone from benzaldehyde
08*. Identification of organic compounds pertaining to phenols, amides, amines, carboxylic acids, aldehydes and ketones, alcohols, esters, hydrocarbons, nitro compounds and ethers by systematic qualitative organic analysis including preparation of derivatives.

TEXT-BOOKS :

01. R.T.Morrison and R.N.Boyd. 'Organic Chemistry'. Allyn and Bacon, In., Boston.
02. I.L.Finar, 'Organic Chemistry', Vol.1, the English Language Book Society, London.
03. B.S.Furniss, A.J.Hannaford, V.Rogers, P.W.G.Smith and A.H.Tatchell, Vogel's Text Book of Practical Organic Chemistry (Including qualitative organic analysis). The English Language Book Society.
04. Study guide to accompany the T.B. of organic chemistry by Morrison and Boyd-Morrison and Boyd.5
05. Problems and their solution in Organic Chemistry – I.L.Finar.
06 Rama Rao Nadendla, Principles of Pharmaceutical Organic Chemistry, MacMillan India Ltd., New Delhi.

"Honesty is the best policy."

I/IV B.PHARMACY (1st & 2nd SEMESTERS)

104 PHYSICAL PHARMACY-I (Theory) (75 hrs.)

Unit : 01

Intermolecular forces and states of matter : Binding forces between molecules,

States of matter : Gaseous state , liquid state, solid state and crystalline state, phase equilibria and the phase rule.

Unit : 02

Thermodynamics : The first law of thermodynamics, theromo- chemistry, the second law of thermodynamics, the third law of thermodynamics, free energy functions and applications.

Unit : 03

Some physical properties of drug molecules: Dielectric constant, induced polarization, dipole moment, refractive index and molar refraction, optical rotation and optical dispersion.

Unit : 04

Solutions : Concentration expressions, solutions of nonelectrolytes, ideal and real solutions, colligative properties, molecular weight determinations.

Solutions of Electrolytes : Properties of solutions of electrolytes, the arrhenius theory of electrolytic dissociation, the modern theory of strong electrolytes and other coefficients for expressing colligative properties.

Unit : 05

Ionic Equilibria : Modern theories of acids, bases and salts, Sorensen's p^H scale, species concentration as a function of p^H, calculation of p^H, graphical solution of p^H problems, acidity constants .

Buffers and Buffered Isotonic systems : The buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions, methods of adjusting tonicity and p^H

Unit : 06

Electromotive Forces and Oxidation-Reduction systems : Electro-chemical cells, electro metric determination of p^H and redox potentials.

Viscosity :Viscosity, poisseullis formula for liquids, experimental determination of viscosity, ostwald viscometer, comparison of viscosities.

Photochemistry : Consequences of light absorption, jablenski diagram, lambert-Beer law and quantum efficiency.

II/IV B.PHARMACY (1st & 2nd SEMESTERS)

105 PHYSICAL PHARMACY - I (Practicals) (75 hrs.)

01. Determination of solubility of Salicylic acid
02. Determination of viscosity of given liquid.
*03. Effect of temperature on viscosity
04. Determination of density of given solid
*05. Determination of upper consolute temperature of phenol-water system
*06. Effect of sodiumchloride on CST of phenol-water system.
07. Determination of surface tension.
08. Determination of interfacial tension.
09. Determination of dielectric constant and its relationship to solubility
10. Determination of optical activity.
11. Determination of pK_a of salicylic acid
12. Preparation of acetate buffer of pH 4
*13. Determination of pK_a of acetic acid by graphical method.
14. Determination of Buffer capacity.

Text Books :

01. Physical Pharmacy by Alfred Martin
02. Bentley's Text book of Pharmaceutics by E.A.Rawlins.
03. Remington's Pharmaceutical Sciences.

"Never put off 'till tomorrow what you can do today"

I/IV B.PHARMACY (1st & 2nd SEMESTERS)

106 COMPUTER APPLICATIONS AND STATISTICAL METHODS

(Theory) (75 hrs.)

Unit : 01

Introduction to computers development, computer types, characteristics, anatomy – input and output devices and other components – computer codes and arithmetic, flow chart, algorithm, languages.

BASIC Language : BASIC Program structure, constants, variables, expressions, LET. REM, STOP and END statements, input / output statements, control statements, additional statements, simple programme writing related to statistics.

Unit : 02

Introduction to DOS environment DOS usage

Fundamentals of BASIC Language: BASIC programmes, structure, loading and unloading, Basic Interpretor, Basic alphabet, constants, variables, operators, Expressions, hirarchy of operations.

Branching and Looping : IF-THEN, ELSE-GOTO, ON GOTO, GOSUB, ON GOSUB, WHILE – WEND, FOR-NEXT.

Arrays : Subscribed variable, single and multiple dimensions.

Graphs and sound : LINE, CIRCLE, DRAW, PSET, POINT, PAINT, PUT, GET, SOUND, PLAY etc.

Unit : 03

Introduction to C language : Development of C, Features, constants and variables, data types, operators and expressions, library functions,

I/O statements : Formatted and unformatted I/O, Scanf(), Printf(), getchar() and putchar() function.

Control structures : conditional and unconditional, IF, FOR, WHILE , SWITCH, BREAK and CONTINUE, GOTO statement. Application of Computers in Pharmacy

Unit : 04

Introduction to statistics, chance variations, collection, classification, graphical and pictorial representation of data, measures of central tendency and dispersion. Precision and Accuracy- Measures of Error.

Unit : 05

Probability, Normal and Binomial distributions, sampling distributions - standard error and Fiducial limits. t-test, chi-square test, F-test of significance - Principle involved and applications, analysis of variance (ANOVA).

Unit : 06

Correlation coefficient and Regression analysis – Method of least squares.

TEXT BOOKS :

01. Remington's Pharmaceutical Sciences.
02. Basic Computer Programming by Er.V.K.Jain
03. Biostatistics by Alwin L.Lewis
04. Computers and common sense - N.Hunt and J.Shelley.
05. Programming in "C" by E.Balaguru Swami.

I/IV B.PHARMACY (1st & 2nd SEMESTERS)

201 PHARMACEUTICS - I (Theory) (75 hrs)

UNIT : 01

History of Pharmacy : Pharmacy Profession, Pharmacy as a career, Evolution of Pharmacy - Pharmacopoeia of India and other countries, B.P., B.P.C., U.S.P.

Metrology : Systems of Weights and Measures - Metric and Imperial systems - Percentage calculations and adjustment of products - **Interconversions** - Use of alligation method in calculations - Isotonic solutions and proof spirits.

Packaging and Labelling of Pharmaceuticals : Desirable fea-tures of a container - Types of containers - Study of glass and plastics as materials for containers and rubber as a material for closures - their merits and demerits - Labelling require-ments.

UNIT: 02

Introduction to Dosage Forms: Classification - Types with examples, Definitions and essential characteristics of differ-ent dosage forms - Formulation and its purpose - Formulation

Additives : Solvents, Vehicles for Liquids, Antioxidants, Pre-servatives, Colouring agents, Sweetening and flavouring agents in Liquid dosage forms.

UNIT:03

Liquid oral dosage forms : Definitions, General formulation, methods of preparation, uses of official and other products in common usage of the following : Solutions, Aromatic Waters, Spirits, Syrups, Elixirs, Dry Syr-ups, Mixtures.

UNIT:04

Monophasic Liquids for external and other uses: Definitions, general formulation, methods of preparation, uses of official and other products in common usage of the following: Lotions, Liniments, throat paints, gargles, mouthwashes, glycerins, collodions, Ear drops, Nasal drops and Sprays, Douches.

Biphasic liquid dosage Forms : Suspensions and Emulsions - Definitions, Types, Ideal requirements, Formulation additives, Typical examples for oral and external use, Methods of prepara-tion.

UNIT:05

Galenicals: Study of extraction processes – Maceration Percolation and their modifications, continuous hot extrac-tion - Their applications. Principles and methods of prepa-rations of dry, soft and liquid extracts and tinctures of I.P and B.P (Latest editions).

UNIT:06

Powders: Definition, Classification of Powders, Preparation of different types of Powders, Packing of Powders. Brief introduction on Cachets'.

Suppositories and Pessaries: Ideal requirements, differ-ent bases, Preparation methods - Typical examples, cal-culations involving displacement value - Packaging and supply.

U.V. Spectrophotometer & H.P.L.C

I/IV B.PHARMACY (1st & 2nd SEMESTERS)

202 PHARMACEUTICS–I (General Pharmacy)

(Practicals) (75 hrs.)

Preparation of the following classes of dosage forms.

AROMATIC WATERS

01. Chloroform water I.P.
02. Cinnamon water
03. Camphor water
04. Peppermint water

SOLUTIONS

05. Aqueous iodine solution (Lugol's solution)
06. Strong iodine solution I.P. (Strong tincture of iodine)
07. Weak iodine solution I.P. (Tincture of iodine)
08. Strong ammonium acetate solution.
09*. Surgical solution of chlorinated soda (Dakin's solution)
10*. Cresol with soap solution I.P. (Lysol solution)

SYRUPS

11. Syrup
12. Citric acid syrup USP
13. Codeine phosphate syrup
14*. Compound ferrous phosphate syrup

ELIXIRS

15. Compound benzaldehyde elixir
16. Terpin hydrate elixir

LOTIONS

17. Copper and zinc Sulphate lotion BPC
18. Sodium thiosulphate lotion
19*. Calamine lotion
20. Benzyl benzoate lotion
21. Lime cream (Oily calamine lotion)

LINIMENTS

22. Camphor liniment (Camphorated oil)
23. Turpentine liniment

GARGLES

24. Phenol gargle BPC

MOUTH WASHES

25. Phenol and alkali mouth wash
26. Compound sodium chloride mouth wash

THROAT PAINTS

27. Compound iodine paint (Mandl's throat paint)

DOUCHES

28. Solution of alum (Vaginal douche)
29. Potassium permanganate solution BPC

EAR DROPS

31. Hydrogen peroxide ear drops BPC
32. Sodium bicarbonate ear drops
33. Phenol ear drops

NASAL DROPS

34. Ephedrine hydrochloride nasal drops.

GLYCERITES

35. Phenol glycerin
36. Borax glycerin
37. Starch glycerin
38. Tannic acid glycerin

SUSPENSIONS

39. Magnesium carbonate suspension BPC
40. Magnesium trisilicate suspension BPC
41. Paediatric chalk mixture
42*. Magnesium hydroxide suspension IP (Milk of magnesia)
43*. Liquid paraffin emulsion
44*. Calciferol emulsion
45*. Castor oil emulsion
46. Castor oil enema (Emulsion)

SUPPOSITORIES :

47*. Glycero-gelatin suppositories
48. Crystal violet pessaries

TEXT BOOKS :

01. Bentley's Text book of Pharmaceutics.
02. Introduction to Pharmaceutical Dosage Forms by H.C.Ansel
03. Cooper and Gunn's – Dispensing for Pharmaceutical Students
04. American Pharmacy by Sprowls
05. I.P. 3rd Edition
06. Remington's Pharmaceutical Sciences.
07. General Pharmacy and Professional Pharmacy by M.L.Schroff.

"Wisdom is better than strength"

II/IV B.PHARMACY (1st & 2nd SEMESTERS)

203 PHARMACEUTICAL ANALYSIS-I (Theory) (75 hrs.)

Unit : 01

Balances : Different types and weighing, types of analysis, obtaining sample, measurement of sample and types of pipettes. Computation of Analytical Results: Significant numbers, sources of errors and their rectification, statistical treatment of the data and rejection of data. Ionic equations of solutions, stoichiometric and analytical problems; Determination of Normality, percentage purity, Molarity, Molality and their inter conversions.

Unit : 02

Impurities in Pharmaceuticals and Limit tests : Sources and effects of impurities in pharmacopoeial substances, importance of limit test, general principles and procedures for limit tests for chloride, sulphate, iron, arsenic, lead and heavy metals. Special procedures for limit tests.

Unit : 03

Principles of Volumetric and Gravimetric Analysis : Standardization; Use of primary and secondary standards. Acid base concept, common ion effect and solubility product, p^H and buffers. General principles and theory of acidimetry, alkalimetry, Oxidation, reduction methods, precipitation methods. An account of the indicators used in these titrations. Diazotisation titrarions.

Unit : 04

Gravimetric methods : Typical methods involving precipitation, coagulation, incineration or digestion procedures.

Unit : 05

Complexometric titrations : Theory, types and application in pharmaceutical analysis. Masking and demasking agent and its application.

Non-aqueous Titrations : Theory, types and applications in pharmaceutical Analysis

Unit : 06

Determination of moisture content and alcohol content, theory and methods involved.

Good Laboratory Practices: Introduction to good laboratory practices. Importance of GLP in analysis of pharmaceuticals Principle of gas Analysis

II/IV B.PHARMACY (1st & 2nd SEMESTERS)

204 PHARAMCEUTICAL ANALYSIS

(Practicals) (75 hrs.)

I-ACID-BASE TITRATIONS

01. Standardization of hydrochloric acid
02. Standardization of sodium hydroxide
03. Assay of sodium bicarbonate
04*. Assay of borax
05. Assay of ammonium chloride
06*. Assay of boric acid
07*. Assay of zinc oxide

II-REDOX TITRATIONS

08*. Assay of ferrous ammonium sulphate (Mohr's salt)
09. Assay of hydrogen peroxide solution
10*. Assay of copper sulphate

III-COMPLEXOMETRIC TITRATIONS

11. Assay of calcium lactate
12*. Assay of magnesium sulphate

IV-ANALYSIS OF PHARMACEUTICAL DOSAGE FORMS

13. Estimation of nalidixic acid in nalidixic acid oral suspension
14. Estimation of calcium gluconate in calcium gluconate injection.

V-LIMIT TESTS

15. Limit test for chlorides
16. Limit test for sulphates
17. Limit test for iron
18*. Limit test for arsenic

TEXT BOOKS :

01. Quantitative Inorganic Analsysi by A.I.Vogel
02. Bentley and Driver – Text book of Pharmaceutical Chemistry
03. Practical Pharmaceutical Chemistry – A.H.Backett and J.B.Stenlake
04. Indian Pharmacopoia
05. Quantitative Pharmaceutical Chemistry by Chatten.
06. Quantitative analysis by R.A.Day and A.L.Underwood.
07. Pharmaceutical analysis by P.C.Kamboj

II/IV B.PHARMACY (1st & 2nd SEMESTER)

205 ENVIRONMENTAL STUDIES (Theory) (75 hrs.)

Unit : 01

Module 1: Introduction

- Definition, scope and importance
- Measuring and defining environment development : indicators

Module 2: Ecosystems

- Introduction, types, characteristic features, structure and functions of Ecosystems
- Forest
- Grassland
- Desert
- Aquatic (lakes, rivers, and estuaries)

Module 3: Environment and Natural Resources Management

Land Resources

- Land as a resource
- Common property resources
- Land degradation
- Soil erosion and desertification
- Effects of modern agriculture, fertilizer-pesticide problems,

Forest resources

- Use and over-exploitation
- Mining and dams – their effects on forest and tribal people

Water resources

- Use and over-utilization of surface and ground water
- Floods, droughts
- Water logging and salinity
- Dams – benefits and costs
- Conflicts over water

Energy resources

- Energy needs
- Renewable and non – renewable energy sources
- Use of alternate energy sources
- Impact of energy use on environment

Unit : 02

Module 4: Bio – diversity and its conservation

- Value of bio-diversity - consumptive and productive use, social, ethical, aesthetic and option values.
- Bio-geographical classification of India – India as a mega diversity habitat.
- Threats to biodiversity – Hot spots, habitat loss, poaching of wildlife, loss of species, seeds, etc.
- Conservation of bio-diversity, In-situ and Ex-situ conservation

Unit : 03

Module 5: Environmental pollution – Local and Global Issues

- Causes, effects and control measures of
- Air pollution
- Indoor air pollution
- Water pollution
- Soil pollution
- Marine Pollution
- Noise pollution
- Solid waste management, composting, vermiculture
- Urban and industrial wastes, recycling and re-use.
- Nature of thermal pollution and nuclear hazards
- Global Warming
- Acid Rain
- Ozone layer depletion

Module 6: Environmental Problems in India

- Drinking water, Sanitation and public health
- Effects of activities on the quality of environment
  - * Urbanization
  - * Transportation
  - * Industrialization
  - * Green revolution
- Water scarcity and Ground Water depletion
- Controversies on major dams, - resettlement and rehabilitation of people: Problems and concerns
- Rain water harvesting, cloud seeding and watershed management

Unit : 04

Module 7: Economy and Environment

- The economy and environment interaction
- Economics of development, preservation and conservation
- Sustainability; theory and practice
- Limits to Growth
- Equitable use of resources for sustainable lifestyles
- Environmental Impact Assessment

Module 8: Social Issues and the Environment

- Population growth and environment
- Environmental education
- Environmental movements
- Environment vs Development

Unit : 05

Module 9: Institutions and Governance

- Regulation by Government
- Monitoring and Enforcement of Environmental regulation
- Environmental Acts
  - Water (Prevention and Control of pollution) act
  - Air (Prevention and Control of pollution) act
  - Envt. Protection act
  - Wild life Protection act
  - Forest Conservation act
  - Coastal Zone Regulations
- Institutions and policies relating to India
- Environmental Governance

Module 10: International Conventions

- Stockholm Conference 1972
- Earth Summit 1992
- World Commission for Environmental Development (WCED)

Unit : 06

Module 11: Case Studies

- Chipko movement
- Narmada Bachao Andolan
- Silent Valley project
- Madhura Refinery and Taj Mahal
- Industrilisation of Pattancheru
- Nuclear reactor at Nagarjuna Sagar
- Tehri Dam
- Relegan Siddhi (Anna Hazare)
- Kolleru lake – aquaculture
- Fluorosis in Andhra pradesh

Module 12: Field work

- Visit to a local area to document and mapping environmental assets – river/ forest/ grass land/ hill/ mountain
- Study of local environment – common plants, insects, birds
- Study of simple ecosystems – pond, river, hill, slopes etc.
  Visits to Industries, Water treatment Plants, Effluent treatment plants.

TEXT BOOKS :

1. Introduction to Environmental sciences by Y.Anjaneyulu,
2. Environmental sciences by Dr.U.Sai Jyothi.
3. A text book of Environmental science by Aravind Kumar
4. A text book of Environmental sciences by Purohit, Shammi, Agrawal
5. Environmental sciences by Kaushik
6. Principles of Environmental studies by C.Manoharachary & P.Jayarama Reddy.
7. Ecology and Environment by P.D.Sharma.
8. Environmental studies (for U.G.) - J.P.Sharma

Tablet Punching Machine

II/IV B.PHARMACY (3rd SEMESTER)

301 PHARMACEUTICAL CHEMISTRY –II (ORGANIC-II)

(Theory) (75 hrs.)

Unit : 01 Stereochemistry :

a. Stereo isomerism, tetrahedral optical activity, enantiomerism, diastere oisomerism, meso structures, elements of symmetry, chirality, chiral centers, absolute configuration, specification of D and L configuraton. Nature of E and Z forms. Recemic modification and resolution of recemic mixture, conformational isomers, asymmetric synthesis.

b. **Geometrical isomerism :** Principles, nomenclature of isomers, determination of configuration.

c. Stereochemistry of alicylic compounds, biphenyls and oximes.

Unit : 02 Chemistry of Aromatic compounds :

a. Aromaticity, structure of benzene, stability of benzene, general methods to prepare aryl halides.

b. Mechanism of electrophilic aromatic substitution(nitration, sulphonation, Halogenation, Friedal Craft's alkylation, acylation), Electrophilic aromatic substitution reactions of substituted benzenes, including reactivity, orientation and influence of activating and deactivating groups, mechanisms of nucleophilic aromatic substitution and mechanisms of electrophilic and nucleophilic addition reactions of α, β-unsaturated carbonyl compounds.

c. General methods of preparation and chemical reactions of amines, phenols and diazonium salts.

Unit : 03 Chemistry of polynuclear aromatic hydrocarbons :

Synthesis (Haworth's), properties and chemical reactions of naphthalene, phenanthrene and anthracene. Structure and medicinal uses of propranolol, Tolnaftate, menadione, naphazoline, phenindione, morphine and codeine.

Unit : 04 Chemistry of heterocyclic compounds :

a. General classification and nomenclature of heterocyclic compounds

b. Synthesis, properties and reactions of furan, pyrole, thiophene, pyridine, quinoline and isoquinoline.

c. Structures of acridine, benzopyran, pyrazole, imidazole, benzimidazole, oxazole, isoxazole, thiazole, pyrimidine, pyridazine and phenothiazine.

d. Structure and medicinal uses of phenazocine, nicotinic acid, nikethamide, isoniazid, mepyramine, benzhexol, chloroquine, histamine, carbimazole, pyrimethamine, piperazine, diazepam, diethylcarbamazine citrate, sulphadiazine, metronidazole.

Unit : 05 Name reactions:

Beckmann, Fries, Schimdt rearrangements; Clemmensen reduction, Oppenauer oxidation, Mannich reaction and Phillips reaction.

Unit : 06 Reagents used in organic synthesis:

Preparation and applications of N- Bromo sucinimide, Lead tetra acetate and Lithium Aluminium hydride.

II/IV B.PHARMACY (3rd SEMESTER)

302 PHARMACEUTICAL CHEMISTRY-II

(Practicals) (75 hrs.)

01*. Qualitative analysis of organic binary mixtures containing water insoluble organic compounds (05 organic binary mixtures should be analyzed)

02) Preparation of methyl orange

03) Preparation of methanamine (Urotropine)

04*) Preparation of para nitro aniline

05*) Preparation of para bromo aniline from acetanilide.

06) Preparation of fluoroscine

TEXT BOOKS :

01. R.T.Morrison and R.N.Boyd, "Organic Chemistry', Allyn and Bacon, Inc., Boston.

02. I.L.Finar, "Organic Chemistry', Vol. 1, The English Language Book Society, London.

03. B.S.Furniss, A.J.Hannaford, V.Rogers, P.W.G.Smith and A.H.Tatchell, Vogel's Text Book of Practical Organic Chemistry The English Language Book Society.

04. F.G.Mann and B.C.Saunders, Practical Organic Chemistry, Longmans, Green & Co., Ltd., London.

05. R.M.Acheson, An introduction to the Chemistry of Heterocyclic Compounds, Interscience Publishers, New York.

07. Rama Rao Nadendla, Pharmaceutical Organic Chemistry, (Chemistry of Heterocyclic and Natural Compounds), Vallabh Publications, New Delhi

"If you want something done right, you have to do it yourself"

II/IV B.PHARMACY (3rd SEMESTER)

303 PHARMACEUTICAL ENGINEERING-I (Theory) (75 hrs.)

Unit : 01

Introduction : Fundamental concept of material and energy balances, Units and Dimensions : Simple inter-conversions of units used in engineering calculations, dimensional analysis, Definitions of Stoichiometry, Unit operation, unit process and chemical technology, laboratory scale, pilot scale and industrial scale operations.

Unit : 02

Flow of fluids : Concepts of fluid statics and dynamics, construction of simple, differential and inclined manometers. Reynolds's number, Bernoulli's theorem and definition of head, friction losses, enlargement losses contraction losses, study of orifice meter, venturimeter , pilot tube and rotameter , simple problems on Bernoulli's theorem, friction losses and flow meters.

Transportation solids : Construction details advantages and disadvantages of belt conveyors, screw conveyors and pneumatic conveyors, bucket elevators.

Transportation of Fluids : Pipe standards, Joints fittings, cocks, globe valve, check valves, regulating valve, pumps, piston pump, plunger/pump, diaphragm pump, rotary pump, single stage suction centrifuge pump, self priming pump. Performance of reciprocating and centrifugal pumps

Unit : 03

Materials of pharmaceutical plant construction : Importance of materials in construction, the merits and demerits of different commonly used materials in plant construction such as iron, steel, copper, tin, aluminum, glass, rubber and plastic. Concept of corrosion, scale formation factors in forming corrosion, methods of reducing corrosion. Mechanical, Chemical, Electrical, Fire and Dust hazards. Industrial dermatitis, Accident Records.

Unit : 04

Humidity and air-conditioning : Definitions of humidity, relative humidity, percentage humidity, humid heat, humid volume, dew point, humidity chart, wet bulb theory, factors influencing the wet temperature, adiabatic saturation temperature. Theory of air - conditioning and description of equipment. Refrigeration principle and description of equipment.

Unit : 05

Mixing : Solid – Solid mixing- Mechanisms of Mixers-V-type, paddle and Rototube mixers- selection of mixer- Mixing of viscous masses, kneading machines and ointment mills-Liquid-Liquid equipment, impellers-their characteristics.

Unit : 06

Size reduction and Separation : Importance of size reduction. Theories of size reduction, factors Influencing size reduction, energy in size reduction, cutter mill, ball mill ,fluid energy mill, hammer mill, colloid mill-Selection of machinery. Principles of size separation, particle size distribution-Representation of screens, screening equipment, trommels, shaking and vibrating screens gyratory screens, cyclone, air and hydraulic separator, bag – filter, Cottrell precipitator, scrubber, sedimentation theory.

TEXT BOOKS :

01. Introduction to chemical Engineering by Badger and Banchero
02. Pharmaceutical Engineering by K.Samba Murthy
03. Principles of Engineering Drawing by A.C.Parkinson
04. Pharmaceutical Engineering by C.V.S.Subrahmanyam,
05. Pharmaceutical Engineering by Dr.Girish K.Jani
06. Introduction to Pharmaceutical Engineering by Dr.A.R.Paradkar
07. Cooper and Gunns tutorial pharmacy by S.J.Carter.

“Necessity is the mother of invention”

II/IV B.PHARMACY (3rd SEMESTER)

304 PHARMACEUTICAL MICROBILOGY

(Theory) (75 hrs.)

Unit : 01

Study of morphology, classification of bacteria, yeasts, actinomycetes, protozoa, fungi and viruses. Mutation, Mutagens, Bacterial Conjugation, Transformation and transducation.

Unit : 02

Preparation of media for bacterial, fungal and actinomycete cultures. Different methods for isolation, purification and preservation of microbial cultures. Introduction to microbiology of water, air and milk and methods of quantitative evaluation of microbial contamination.

Unit : 03

Theory of staining, Gram, acidfast, flagella, spore staining methods. Study of bacterial growth : effect of UV light, ultrasonic waves, temperature, pH, osmotic pressure, salt concentration and metal ions.

Unit : 04

An outline of theories of antimicrobial action of drugs and chemicals. Study of sterilization by moist and dry heat, construction and working of autoclave, sterilization by filtration, radiations and gases. Dynamics of disinfection, disinfectants - the mechanism of action, merits and demerits. Evaluation of bacteriociodes and bacteriostatics.

Unit : 05

Principles of immunology, methods of transmission of disease carriers, vectors and reservoirs, General methods of Immunization against diseases. Funcamentals of serology : Neutralization, Precipitation, Opsonization, agglutination, complement fixation tests and ELISA.

Unit : 06

The study of etiology, diagnosis, source of infection, mode of transmission, immunization methods, prevalence and control of the following diseases: Bacillary dysentery, diphtheria, tuberculosis, leprosy, cholera, syphilis, gonorrhea, tetanus food poisoning, rabies, polio, detrameophytes, malaria and Amoebiasis, AIDS, Hepatitis.

II/IV B.PHARMACY (3rd SEMESTER)

305 PHARMACEUTICAL MICROBIOLOGY

(Practicals) (75 hrs.)

01. General rules and procedure in microbiology lab
02. Aquaintere of equipment in microbiology lab
03. Preparation of culture medium for bacteria and potato dextrose agar medium for fungi. Cultivation of microorganisms.
04. Aseptic culture transfer techniques.
05. Simple staining
06*. Gram staining
07*. Bacterial motility
08. Acid-fast staining
00. Negative Staining
10. Oligo dynamic action of copper
11. Isolation of pure cultures by streak plate method.
12. Spore Staining
13. Viable count of microbes of serial dilution method.
14. Rideal-walker test
15. Determination of antibiotic sensitivity
16. Effect of UV-rays on life of bacteria
17. Microscopic observation of fungi
18. Starch hydrolysis

TEXT BOOKS :

01. Microbiology by Pelczar
02. Text Book of Microbiology by Ananth Narayan.
03. Microbiology - An introduction by Toratora.
04. Microbiology by Prescott
05. Pharmaceutical Microbiology by Chandrakant R.Kokare
06. Immunology - by KUBY

"Actions speak louder than words"

II/IV B.PHARMACY (3rd SEMESTER)

306 ANATOMY AND PHYSIOLOGY (Theory) (75 hrs.)

Unit : 01

Introduction : Introduction to anatomical terms in relation to parts of the body, systems and organs. Elementary knowledge of the human skeleton.

Tissues of the body: Properties and functions of epithelial, connective, muscular, nervous and osseous (bone) tissues. General principles of membrane permeability, diffusion, transport membrane potentials, action potentials.

Unit : 02

Nervous system : Neuron, synapses, ganglion, plexus, physiology of nerve impulse, neurotransmission, reflex arc, central nervous system (parts and functions) and autonomic nervous system.

Unit : 03

Cardiovascular system and Blood : Heart, blood Vessels, cardiac cycle, circulation, blood pressure and its regulation and blood (composition and functions)

Unit : 04

Respiratory system : Gross anatomy of respiratory passages, physiology of res piration, nervous control of respiration.

Digestive System : Gross anatomy of alimentary canal, movement of alimentary canal, gastric secretions and the enzymes involved in digestion.

Unit : 05

Endocrine System : Physiological considerations of thyroid, pancreas, pituitary, gonads and suprarenal glands.

Urinogenital System : General disposition of organs of excretion, physiological consideration of urine formation, out put, factors controlling it.

Unit : 06

Physiology of special senses : Hearing, vision, smell, taste and structure and functions of skin.

II/IV B.PHARMACY (3rd SEMESTER)

307 ANATOMY & PHYSIOLOGY (Practicals) (75 hrs.)

1. Study of Histology slides of different tissues/organs
2. **Study of specimens and bones :**
   (Human heart, Human skeleton, Human Digestive system, Human Nose, Human Skin, Human tongue, Human Respiratory system, Human Eye, Human Brain.)
3. Determination of blood pressure
4. Determination of blood groups.
5. Determination of haemoglobin content of blood.
6. Determination of R.B.C. content of blood.
7. Determination of W.B.C. content of blood
8. Determination of bleeding time.
9. Determination of clotting time.
10. Determination of differential leukocyte count of blood.
11. Determination of erythrocyte sedimentation rate of blood.
12. Recording of normal cardiogram of frog's heart.
13. Effect of heat and cold on normal cardiogram of frog's heart.

TEXT BOOKS :

01. Text book of Medical Physiology by A.C.Guyton
02. Human Physiology by A.J.Vander, J.H.Sherman and D.S.Lucion
03. Samson Wright's applied physiology by Keele and Neil
04. The Living Body - A text book in human physiology by Best and Taylor.
05. Principles of Anatomy & Physiology by Tortora and Grabowski.
06. Ross and Wilson - Anatomy and Physiology by Anne waugh and Allison Grant.
07. Human physiology by Dr.C.C.Chaterjee.

"A wise man shall hold his tongue till he sees his opportunity"

II/IV B.Pharmacy (4th Semester)

401 PHARMACEUTICAL CHEMISTRY–III (MEDICINAL-I)

(Theory) (75 hrs.)

Unit : 01

Brief introduction to medicinal chemistry and development of medicinal chemistry, physicochemical properties of drugs in relation to biological action, drug receptor interaction, transduction mechanism and G-coupled receptors

Unit : 02

Sulphonamides: History, nomenclature, classification based on kinetics, clinical and chemical along with structures, metabolism crystal urea, prodrug concept in sulphonomides, structure activity relation ship(SAR), Therapeutic uses metabolism and synthesis of sulphamethoxazole, trimethoprim, sulphacetamide, sulphapyridine, sulphasalazine, sulphamoxol, sulphafurazole, sulphaguanidine, sulphadoxine, sulphadimidine.

Atiinfective agents: Definition, classification, ideal requirements of antiinfectives, structures, synthesis and uses of important antiinfectives and synthesis of hexylresorcinol, nitrofurazone, chlorobutanol methylparaben.

Unit : 03

Antibiotics: Brief historical background and classification of antibiotics based on spectrum, nature, chemical and mechanism of action.

Penicillins: Historical background, biological sources, nomenclature, classification of penicillins based on source and spectrum of activity along with structures of different penicillins, degradation of penicillins, semi synthetic penicilins, the effect of stereochemistry in designing orally active penicillins, depot penicillin preparations, general method of synthesis of pencillins from 6-Amino penicillanic acid(APA), structure activity relation ship(SAR), mechanism of action, synthesis and therapeutic uses of benzyl penicillin, ampicillin, amoxycillin, carbenicillin, phenoxymethyl penicillin. A note on β-lactamase inhibitors.

5. **Cephalosporins:** Biological sources, classification based on generation, degradation of cephalosporins, comparison of 6-Aminopenicillanic acid(APA) and 7-aminocephalosporanic acid (ACA), penam and cepham, structure activity relation ship(SAR), advantages over penicillins, structures and synthesis of cephalexin, cephaloridine, cefuroxime , cefatoxime, cefoperazone and cefaclor.

Tetracyclines : Biological sources, structures of the important tetracyclines, important structural units and the three acidity constants in the tetracycline molecule, amphoteric nature, epimerisation, chelation with metals, mechanism of action, spectrum of activity, structure activity relationship (SAR) and therapeutic uses.

Aminoglycosides: Structure, acid hydrolysis, mechanism of action, therapeutic uses, metabolism and toxicity of streptomycin. structure of dihydrostreptomycin and its importance. A mention of other aminoglycoside antibiotics. Synthesis, metabolism, SAR and therapeutic importance of levorotatory form of chloramphenicol.

Macrolides: Classification, structure activity relationship (SAR) metabolism and toxicity.

Fluoro Quinolone antibacterials : Structure activity relationship (SAR) of quinolones, metabolism and synthesis of norfloxacin, gatifloxacin, nalidixic acid, sparfloxacin, pefloxacin and ofloxacin.

Unit : 04

Antimalarials: Etiology of malaria, classification, mechanism of action, SAR, therapeutic uses, structures and synthesis of chloroquine, amodiaquine, primaquine, quinacrine, pyrimethamine and proguanil. A brief note on Artemisinin.

Anthelmintics: Definition, classification, mechanism of action of anthelmintics, synthesis and therapeutic uses of diethylcarbamazine, mebendazole, niclosamide, pyrantelpamoate, albendazole, piperazine citrate and niridazole

Antiamoebics: Classification and mechanism of action of antiamoebics, synthesis and therapeutic uses of metronidazole, diloxanide furoate, iodoquinol, furazolidone

Unit : 05

Antifungal agents: Introduction, classification, structures, mechanism of action and therapeutic uses of antifungal drugs, structure activity relationship(SAR) of azole antifungal agents, structures and synthesis of benzoic acid, salicylic acid, clotrimazole, ketoconazole, fluconazole, tolnaftate, miconozole, econozole, griseofulvin and flucytosine.

Anti-Tubercular Drugs: Introduction, classification, structure activity relationship (SAR), mechanism of action, structures of imortant antitubercular drugs and synthesis of INH, ethambutol, pyrazinamide, ethionamide and PAS

Antileprotics: Introduction, classification, structure activity relationship (SAR), metabolism, mechanism of action, synthesis of dapsone and clofazimine

Unit : 06

Antiviral Drugs : Properties of virus, types of viruses, viral replication, classification of antiviral drugs, chemical structures, mechanism of action and therapeutic uses of amantadine, nucleoside antimetabolites(iodoxuridine, vidarabine, acyclovir,famciclovir), reverse trascriptase inhibitors (zidovudine, lamivudine, stavudine, zalcitabine), nucleoside antimetabolites(ribavirin), nonnucleoside reverse transcriptase inhibitors(nevirapine). A brief note on HIV protease inhibitors. Synthesis of amantidine and idoxuridine

Anticancer Drugs: Introduction, classification, mode of action, structures of important anticancer drugs, metabolism and synthesis of chlorambucil, cyclophosphamide, melphalan, cytarabin, 6 – thioguanine, thiotepa, busulphan, procarbazine, carmustine, 5-fluorouracil, 5-mercaptopurine, methotrexate. A brief account of vinca alkaloids and taxol

TEXT BOOKS :

1. Text book of Medicinal Chemistry by William O. Foye, Lea Febiger, Philadelphia.
2. Wilson & Giswold's Text book of organic Medicinal Chemistry and pharmaceutical chemistry by JH Block & JM Beale (Eds), 11th Ed, Lipcott, Raven, Philadelphia, 2004.
3. D. Abraham (Ed), Burger Medicinal chemistry ad Drug discovery, Vol. 1 & 2. John Wiley & Sons, New York 2003,
4. Lippincott Williams and Wilkins: Remington Pharmaceutical Sciences
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry L.M. Atherden. Oxford University Press, Delhi.
6. B.N. Lads, MG.Mandel and F.I. way, Fundamentals of drug metabolism & disposition, William & welking co, Baltimore USA.
7. C. Hansch, Comprehensive medicinal chemistry, Vol 1 – 6 Elsevier pergmon press, oxford 1991.
8. Daniel lednicer, Strategies For Organic Drug Synthesis And Design, John Wiley, N. Y. 1998.
9. Rama Rao Nadendla, Medicinal chemistry, Pharma Book Syndicate, Hyderabad, 2006
10. D. Lednicer, Organic drug synthesis, Vol, 1 – 6, J.Wiley N.Y.

"There's no time like the present"

II/IV B.Pharmacy (4th Semester)

402 PHYSICAL PHARMACY-II (Theory) (75 hrs.)

Study of the applications of physicochemical principles to pharmacy with special reference to the following :

Unit : 01

Solubility and Distribution phenomena : Solvent-Solute interactions, solubility of gases in liquids, liquids in liquids, solids in liquids, distribution of solutes in immiscible solvents. Introduction to phenomena of diffusion : Ficks first law and second law.

Complexation : Types of Complexes, methods of analysis, complexation and drug action.

Unit : 02

Kinetics : Rates and orders of reactions, determination of order of a reaction. Influence of temperature and other factors on reaction rates. Decomposition of medicinal agents. Methods and principles of stabilization, accelerated stability analysis.

Unit : 03

Interfacial Phenomena : Liquid interfaces, measurement of surface and interfacial tensions, adsorption at liqud interfaces. Surface active agents, sytems of hydrophillic – lipophillic classification. Adsorption at solid interfaces. Electrical properties of interfaces.

Unit : 04

Colloids and macromolecular systems : Types of colloidal systems, properties of colloidal Systems, solubilization.

Micromeritics : Particle size and size distribution, methods of determination of particle size, particle shapes and surface area. Derived properties of powders.

Unit : 05

Rheology : Newtonian and Non-Newtonian systems. Thixotropy, its measurement and applications in formulations. Determination of viscosity using rotational viscometers and its applications.

Unit : 06

Coarse Dispersions : Suspensions, emulsions and semisolids :

Suspensions : Interfacial properties of suspended particles, settling in suspensions, formulation of suspensions.

Emulsions : Theories of emulsification, physical stability of emulsions, preservation of emulsions.

Rheological properties of emulsions, suspensions and semisolids.

II/IV B.Pharmacy (4th Semester)

403 PHYSICAL PHARMACY-II (Practicals) (75 hrs.)

01. Effect of phase volume ratio on stability of an emulsion.
02. Micromeritics – I
03. Micromeritics – II
04. Determination of partition coefficient of salicylic acid between water and benzene
05. Determination of first order rate constant associated with decomposition of hydrogen peroxide.
06*. Determination of HLB value of Tween-80
07*. Determination of critical micellar concentration of tween-80.
08. Micellar solubilisation of poorly soluble drugs.
09*. Determination of first order rate constant associated with decomposition of ethyl acetate
10. Determination of particle size by stokes method.
11. Accelerated stability testing of a tablet formulation-I.
12. Accelerated stability testing of a tablet formulation – II.
13. Accelerated stability testing of a tablet formulation by short cut method.
14*. Calibration of eye piece micrometer using stage micrometer and determination of globule size of an emulsion.
15*. Study of adsorption of oxalic acid on charcoal.

TEXT BOOKS :

01.Physical Pharmacy by Alfred Martin
02.Remington's Pharmaceutical Sciences.
03.Tutorial pharmacy.

"Hope for the best, but prepare for the worst"

II/IV B.Pharmacy (4th Semester)

404 APPLIED BIO CHEMISTRY & CLINICAL PATHOLOGY (Theory) (75 hrs.)

Unit : 01

Definition, classification, some properties and reactions of carbohy-drates, lipids and proteins. Diseases related to their metabolism.

Unit : 02

Carbohydrate metabolism : Glycolysis, glycogenolysis, gluconeogenesis, Krebs' cycle, direct oxidative pathway (HMP). Metabolism of lipids. Essentials of fatty acids, Oxidation of fatty acids, ketogenesis, biosynthesis of fatty acids and chlolesterol.

Unit : 03

Metabolism of Proteins and Amino acids : Essential and Non essential Amino acids, general metabolic reactions of amino acids like deamination, transamination, decarboxylation, urea cycle : metabolism of the following aminoacids, glycine, phenylalanine, tyrosine, cyctein, cystine, methionine, tryptophan, valise and lysine.

Unit : 04

Enzymes: classification, structure, mechanism of enzyme action properties, factors influencing enzyme action, activators and deactivators of enzymes , competitive and noncompetitive inhibition with respect to drug action, co-enzymes.

Unit : 05

Bio-chemistry of important body fluids. The biochemical role of minerals, water vitamins and hormones. A brief outline of energy and phosphate metabolism and detoxication mechanisms.

Unit : 06

The Principles involved and the method used in qualitative and quantitative analysis of

a) Blood for the following constituents :

Glucose ,urea, cholesterol, bile salts , bile pigments, creatinine, calcium, phosphates, SGPT and SGOPT.

b) Urine for the following constituents :

Gglucose , ketone bodies, bile Salts, bile pigments, and albumin

c) Introduction to pathology of blood and urine

(1) Lymphocytes and Platelets , their role in health and disease

(2) Erythrocytes Abnormal cells, their significance

(3) Abnormal constituents of urine and their significance in disease.

II/IV B.Pharmacy (4th Semester)

405 APPLIED BIOCHEMISTRY & CLINICAL PATHOLOGY

(Practicals) (75 hrs.)

01. Qualitative analysis of carbohydrates (Glucose, Fructose, Maltose, Lactose, Sucrose, Starch).
02. Qualitative analysis of Amino acids (Glycine, Tyrosine, Cysteine
03. Qualitative analysis of Proteins (Albumin, Casein, Gelatin, Peptone)
04. Identification of normal and abnormal constituents in normal urine sample.
05. Identification of abnormal constituents in the given sample.
06*. Estimation of glucose in urine.
07*. Colorimetric estimation of tyrosine.
08*. Estimation of creatinine in urine.
09*. Estimation of glucose in blood.
10*. Estimation of creatinine in blood.
11*. Estimation of valine by formal titration.
12. Simple enzymatic reaction.

TEXT BOOKS :

01. Text book of Biochemistry by Harper
02. Text book of Biochemistry by Lelinger
03. Biochemistry by A.V.S.Rama Rao
04. Biochemistry by West and Todd.
05. Biochemistry by U.Satyanarayana.
06. Text book of Biochemistry by D.M.Vasudevan, Sree Kumari S
07 Medical Biochemistry by N.Mallikarjuna Rao
08 Test book of Biochemistry with clinical correlatives by Devlin.

"God helps those who help themselves"

III/IV B.PHARMACY (4th SEMESTER)

406 FORENSIC PHARMACY (Theory) (75 hrs.)

Unit : 01

Evolution of pharmaceutical and drug legislation in India –Code of Pharmaceutical ethics.

Legislation to regulate the profession of the pharmacy. The pharmacy Act, 1948.

Unit : 2 & 3

Legislation to regulate the import, manufacture, distribution and sales of drugs and cosmetics – The Drugs and cosmetics Act 1940 and Drugs and Cosmetics Rules 1945, as corrected upto –date.

Unit : 04

Legislation to control the advertisements , excise duties and price of drugs.

a) The Drugs and Magic Remedies (Objectionable advertisement Act.)

b) The Medicinal and Toilet preparations
(Excise duties Act and Rules of 1956)

c) Drugs (Price Control) Order ,1970 as corrected upto-date

Unit : 05

Legislations to control the operations regulating to dangerous drugs, poisons and opium.

a) Poisons Act and Rules

b) The Narcotic Drugs and Psychotropic Substances act, 1985.

Unit : 06

Other Legislation's relating to Pharmaceutical Industry and profession.

a) The Indian Patents and Designs Act,1970 with reference to the Drugs and Pharmaceuticals only.

b) Medical Termination of Pregnancy Act.

c) Shops and Establishments Act

d) Prevention of Cruelty to Animals Act 1960.

TEXT BOOKS :

01. Forensic Pharmacy by B.M.Mithal
02. Forensic Pharmacy by N.K.Jain
03. Text book of Forensic Pharmacy, C.K.Kokate, S.B.Gokhale
04. Forensic Pharmacy by B.S.Kuchekar, A.H.Khadatara, Sachin.C. Itkar.
05. Pharmaceutical jurisprudence and ethics by S.P.Agarwal, Rajesh Kanna

407 ENGLISH & COMMUNICATION SKILLS
(LANGUAGE LABORATORY) (Practicals) (50 hrs.)

01. Functional and advanced grammar
    - i. Basics of english language
    - ii. Tips to learn english language
    - iii. Articles
    - iv. Complete version of parts of speech
    - v. Complete version of tenses
    - vi. Direct and indirect speech
    - vii. Active and passive voice
    - vii. Analysis of sentences
    - ix. Degrees of comparison
    - x. Question tags

02. Verbal and Non-Verbal Skills
    - i. Verbal - concerned with words only; corresponding word for word.
    - ii. Non - verbal - posture and gesture; facial expressions; sign or code language.

03. Accent – Modulation / Pronunciation
    - i. Word accent
    - ii. Stress and rhythm in corrected speech
    - iii. Intonation - falling pitch, rising pitch, rising – falling tone
    - iv. Some common errors in pronunciation

04. Vocabulary Enhancement
    - i. Level -I words
    - ii. Level - II words
    - iii. Level – III words
    - iv. Synonyms and antonyms and their basic word

05. Speaking / Writing Tasks
    - i. Topics to be practiced orally and in written form to enhance speaking skills and writing skills.

06. Presentation Skills
    - i. Model presentation
    - ii. Resume preparation
    - iii. Conversation and telephone etiquette skills

07. Extempore / Elocution
    i. Students are advised to involve in this activity as it develops one's potentiality and to a creative way of thinking and their involvement in general awareness.

08. Personality Development
    i. The art of being dynamic – four dimensions
    ii. Self-analyzing questions
    iii. Human refinement and soft Skills

09. Communication Skills
    i. Value of English
    ii. Status of english in India
    iii. Language and communication skills
    iv. Communication skills in corporate requirements

10. Group Discussions
    i. Group dynamics
    ii. Some selected GD topics for practice purpose

11. Interview Skills
    i. Basics of interview skills
    ii. Preparing yourself for the interview
    iii. How to face interview board
    iv. Ten worst interview blunders
    v. Sample questionnaire and answers

12. Practice tests for IELTS and TOEFL
    i. A blueprint of IELTS and TOEFL
    ii. Most often asked questions in IELTS / TOEFL

13. Reflection of Perfection
    i. Value of being perfect
    ii. A short inspiring story on the importance of perfection

14. Key to Success
    i. Formula for Success
    ii. Ten steps for Transformation
    iii. Tips to learn English Grammar and Spoken English

TEXT BOOKS :

1. English Lab for B.Pharmacy Students by **Anthony**
2. Interview and Group discussion skills with mind blowing questions and top class logical answers by **Anthony**
3. English grammar and composition by **Wren & Martin**

III/IV B.PHARMACY (5th Semester)

501 PHARMACEUTICAL CHEMISTRY-IV (MEDICINAL–II)

(Theory) (75 hrs.)

Unit : 01

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

Unit : 02

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

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

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

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

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

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

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

Unit : 03

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

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

Unit : 04

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

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

Unit : 05

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

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

Unit : 06

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

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

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

III/IV B.PHARMACY (5th Semester)

502 PHARMACEUTICAL CHEMISTRY–IV

(MEDICINAL-II) (Practicals) (75 hrs.)

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

TEST BOOKS

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

IIIIIV B.PHARMACY (5th Semester)

503 PHARMACEUTICS-II

(DOSAGE FORM TECHNOLOGY INCLUDING COSMETICS)

(Theory) (75 hrs.)

Unit : 01

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

Unit : 02

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

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

Semi-solids : Ointments, creams, pastes, jellies-Definitions, Ideal requirements, types of bases, selection of base, typical examples.

Unit : 03

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

Solids : Powders-Types, Typical examples.

Compressed tablets Types, Formulation additives, Formulation, manufacture and quality control of tablets - Examples (I.P.) Processing problems

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

Tablet coating : Purpose, sugar, film and enteric coating methods

Unit : 04

Parenterals : Definitions, Types, Formulation aspects, production facilities, layout, manufacturing and quality control, Typical examples from I. P.

Opthalmic preparations : Eye ointments, Eye drops, requirements

Formulation, manufacture and quality control- I.P. and other important products.

Unit : 05

Pharmaceutical Aerosols : Definition, classification, formulation, propellents, pressurized packagings, applications.

Radiopharmaceuticals : Therapeutic and diagnostic uses. Production of radio pharmaceuticals – care in handling.

Unit : 06

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

504 PHARMACEUTICS – II

(DOSAGE FORM TECHNOLOGY INCLUDING COSMETICS)

(Practicals) (75 hrs.)

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

TEXT BOOKS :

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

III/IV B.PHARMACY (5th Semester)

505 PHARMACOGNOSY-1 (Theory) (75 hrs.)

Unit : 01

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

Unit : 02

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

Unit : 03

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

Unit : 04

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

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

Unit : 05

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

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

Unit : 06

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

IIIIIV B.PHARMACY (5th Semester)

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

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

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

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

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

05. Determination of extractive value of crude drug

06. Extraction of eucalyptus oil

TEXT BOOKS :

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

III/IV B.PHARMACY (5th Semester)

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

Unit : 01

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

Unit : 02

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

Unit : 03

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

Unit : 04

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

Unit : 05

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

Unit : 06

Pharmacology of local anaesthetics and diuretics.

TEXT BOOKS :

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

III/IV B.PHARMACY (6th Semester)

601 PHRAMCEUTICL ENGINEERING-II

(Theory) (75 hrs.)

Unit : 01

Flow of heat:- Concept of heat flow : Conduction through single wall, layers in series and cylinders. Natural and forced convection, temperature gradient in forced convection, concept of surface coefficient, dimensional analysis to compute surface coeffiecnt, boiling liquids, condensing vapours, temperature drop in parallel and counter -current heat exchangers, radiation, Stefan - boltzmann law. Construction, operation and application of heat exchangers, interchangers and finned tubes .

Unit : 02

Evaporation : Theory of evaporation, heat and material balance; evaporator types : Steam jacketted kettle , horizontal, vertical tube evaporator, forced circulation evaporators, falling film and climbing film evaporators and agitated film evaporation. Capacity of multiple effect evaporators.

Unit : 03

Drying : Theory of drying , drying curves shrinkage of materials, construction , operation and application of different dryers, atmospheric and vacuum compartment dryer, rotary dryer, agitator dryer, spray dryer, freeze dryer, fluidized bed dryer.

Unit : 04

Distillation : Theory of distillation of binary miscible, immiscible mixtures . Theory of rectification, azeotropic distillation, steam distillation, simple distillation, extractive and fractional distillation, and molecular distillation design of equipment for different distillation methods.

Unit : 05

Crystalization : Mier's Theory, its limitations ,crystal growth , nucleation, caking of crystals, material and energy balances in crystallization. Construction, operation and application of batch crystallizers, agitated tank crystallizers, Swenson -walker crystallizer, Krystal crystallizer and vaccum crystallizers .

Unit : 06

Filtration : Theory of filtration , filter media construction and operation of filter press, metafilter, disk filter, rotary filter. Centrifuges - Theory, equipment and applications.

Extraction : Theory of extraction, flow diagram of oil- seed extraction equipment, Podbielniak extractor, counter current extraction, leaching of solids and equipment .

III/IV B.PHARMACY (6th Semester)

602 PHARMACEUTICAL ENGINEERING – II

(*Practicals*) (75 hrs.)

Part - A Study of the following equipments

01. Ball mill
02. Fluid energy mill
03. Colloid mill
04. Planetary mixer
05. Plate and frame filter press
06. Rotatory drum filters
07. Film evaporators
08. Multi effect evaporator
09. Spray drier
10. Fluid bed dryer
11. Freeze drying
12. Swenson-walker crystallizer
13. Recirculation magma crystallizer
14. Podbiel niak extract

Part - B

01. Determination of humidity of air
02. Determination of humidity of air by dew-point method
03*. Size separation by sieving method
04*. Size reduction by ball mill
05. Determination of moisture content by IR moisture balance
06. Effect of filter aid concentration on rate of filtration
07. Factors affecting rate of filtration
08*. Determination of efficiency of steam distillation
09*. Determination of radiation constant of unpainted glass
10*. Determination of radiation constant in iron.
11*. Determination of radiation constant of painted glass
12. Size reduction by disintegration mill.
13. Determination of over all heat transfer coefficient.
14*. Determination of drying rate curve for calcium carbonate
15*. Determination of drying rate curve for sand
16. Crystallisation.

TEXT BOOKS :

01. Introduction to chemical Engineering by Badger
02. Text Book of Pharmaceutical Engineering by K.Samba Murthy
03. Perry's Chemical Engineers Hand Book.
04. Pharmaceutical Engineering by C.V.S.Subrahmanyam
05. Bentley's Text book of Pharmaceutics.

III/IV B.PHARMACY (6th Semester)

603 PHARMACEUTICAL BIOTECHNOLOGY

(Theory) (75 hrs.)

Unit : 01

Fermentation Products :

i. Screening methods for bioactive metabolites
ii. Introduction to fermenter and its accessories,
iii. Manufacture of the following : study of media , conditions, extraction and purification of
   a) Antibiotics- Pencillin and streptomycin
   b) Acids- Citric acid and lactic Acid
   c) Solvents - Alcohol
   d) Enzymes - Fungal diastase
   e) Vitamins- Vitamin B12
   f) Miscellaneous - Dextran and lactobacillus

Unit : 02

Test for sterility : Sterility testing , media , sampling, neutralisation of various antimicrobial substances in dosage forms. Surgical dressings, sutures and ligatures and their standards, sterilization and test for sterility.

Unit : 03

Animal products : Extraction and purification of insulin, pancreatin, pepsin, heparin and liver preparations. Blood products and plasma substitutes of I.P

Immunological Products : Manufacture of vaccines, sera, anti-toxins and diagnostic agents official in I.P

Unit : 04

Principles of Microbiological assay of vitamin-B_{12}, penicillin, streptomycin and tetracyclines. Radio Immunoassay - Principles , estimation of insulin in blood serum

Unit : 05

Microbial conversion of steroids, Enzyme immobilization : Methods of enzyme immobilization, factors affecting enzyme kinetics, study of streptokinase, penicillinase, amylase and immobilization of bacterial cells.

Unit : 06

An introduction to Recombinant DNA technology : Brief knowledge about the making of human Insulin, Interferons, monoclonal antibodies, synthetic vaccines and streptokinase.

III/IV B.PHARMACY (6th Semester)

604 PHARMACEUTICAL BIOTECHNOLOGY

(Practicals) (75 hrs.)

01. Nitrate reduction test
02. Hydrogen sulphide production test
03. Study of growth of stationary and rotary shake flask cultures
04. Efficiency of laminar air flow unit
05. Effect of salt concentration on the growth of micro Organisms
06. Effect of PH on growth of micro organisms
07. Indole production test
08. Citrate utilization test
09. Test for sterility of sterile water for injection.
10. Test for sterility of bentonite powder
11. Test for sterility of talcum powder
12. Microbiological assay of tifampicin
13*. Microbiological assay of streptomycin
14. Catalase production test
15*. Microbiological assay of benzyl pencillin
16. Effect of temperature on the growth of micro Organisms
17. Microbiological assay of oxytetracycline
18. Microbial testing of sterile and non sterile products
19. Microbiological assay of benzyl pencillin by cup-plate method

TEXT BOOKS :

01. Industrial microbiology by Casida.
02. Industrial microbiology by Miller
03. Industrial microbiology by Prescott and Dunn.
04. I.P./B.P.
05. Tutorial Pharmacy by Cooper and Gunn.
06. Bentley's Pharmaceutics
07. Principles of Fermentation technology by P.F.Stanbury

"Practice makes perfect"

III/IV B.PHARMACY (6th Semester)

605 HOSPITAL AND CLINICAL PHARMACY

(Theory) (75 hrs.)

Unit : 01

Hospital pharmacy-Organization, personnel, location space and equipment - The Pharmacy and Therapeutic committee, Hospital Formulary, Investigational use of drugs- Developing the budget, purchasing and inventory control.

Unit : 02

The pharmacy procedural manual, Drug distribution, Dispensing to out-patients, in-patients and ambulatory patients- Dispensing of ancillary and controlled substances, procurement and distributions of alcohol

Unit : 03

Manufacturing of bulk and sterile supplies, quality control in Hospital pharmacy. Drug charges in Hospitals, Drug information centre- Professional practices.

Unit : 04

Introduction and scope of clinical pharmacy practice - Modern dispensing aspects- patient counselling and advice- Medication history.

Unit : 05

Drug Interactions-Mechanisms–A systematic study of drug interactions with suitable examples. Drug-food interactions, adverse drug reactions- Drug induced diseases.

Unit : 06

Clinical Pharmacy aspects of

a)	Peptic ulcer,	b)	Angina Pectoris,
c)	Hypertension,	d)	Asthma,
e)	Tuberculosis,	f)	Diabetis,
g)	Acute renal failure,	h)	AIDS,
I)	Hepatitis	j)	Rheumatoid arthritis

III/IV B.PHARMACY (6th Semester)

606 HOSPITAL AND CLINICAL PHARMACY

(Practicals) (75 hrs.)

01. General dispensing procedures
02. Study of Weights and measures
03. Preparation and dispensing of prescriptions of following classes of products : Powders, Mixtures, Ointments, Large Volume Parenterals.
04. Draw the layout and workflow patterns in the dispensary of a hospital.
05. Examine and report the drug distribution methods used in a hospital.

TEXT BOOK :

01. Cooper and Gun-Dispensing for Pharmaceutical Student
02. Hospital Pharmacy by William.E.Hassan
03. Clinical Pharmacy by Tipnis Bajaj
04. Pharmacotherapeutics by Roger and Walker.

Student's observing experiments

IV/IV B.PHARMACY (7th Semester)

701 PHARMACEUTICS-III (Theory) (75 hrs.)

(BIOPHARMACEUTICS, PHARMACOKINETICS & NEW DRUG DELIVERY SYSTEMS)

Unit : 01

Biopharmaceutics :

Introduction , Definitions, Fate of drug after administration , Blood level curves, Routes of drug administration, Drug absorption and disposition . Significance in product, formulation and development. Drug absorption –Structure of biological membrane, drug transport mechanisms, factors and kinetics involved – Physico- chemical and biological factors involved in drug absorption. Formulation and dosage form considerations in drug absorption .

Drug Dissolution : Mechanisms , factors and kinetics of dissolution dissolution rate significance and evaluation – Official methods

Unit : 02

Bioavailability : Concept and definitions, Factors involved on Assessment and significance of Drug Distribution. Plasma protein binding and its implications- Enterohepatic cycling.

Drug Elimination : Drug metabolism, path ways of drug metabolism Excretion- Excretion through urine, faeces, lungs and skin –Mechanism of renal excretion- renal clearance.

Unit : 03

Pharmacokinetics : Introduction – Compartment models –study of the methods of estimation, significance of the following parameters, biological half- life, apparent volume of distribution, renal clearance, total body Clearance, absorption rate, AUC - Mathematical expressions describing the variation in blood concentrations following I.V. and oral routes . Introduction to dosage regimen.

Unit : 04

Non-linear Pharmacokinetics : Non-linear Pharmacokinetics with special reference to one compartment model after IV drug administration, Michaeles-Menten equation. Detection of non linearity (Saturation Mechanism)

Unit : 05

Sustained release dosage forms : Principles and concepts involved, dosage calculations, methods adopted in release controlling, Design, manufacture and evaluation of various types of sustained release products. parenteral long acting products, implants.

Microencapsulation : Purpose and applications – Techniques of microencapsulation

Unit : 06

Novel Drug Delivery Systems : Introduction to Novel Drug Delivery systems – concept of controlled drug delivery, oral and Transdermal delivery systems - Liposomes, Concept on niosomes and resealed erythrocytes

702 PHARMACEUTICS-III (BIOPHARMACEUTICS, PHARMACOKINETICS & NEW DRUG DELIVERY SYSTEMS)

(Practicals) (75 hrs.)

01*. Dissolution rate testing and analysis of data
02*. Effect of surfactant on the solubility and dissolution rate of salicylic acid
03*. Effect of diluents on dissolution rate of salicylic acid
04*. Effect of concentration of magnesium stearate on dissolution rate of salicylic acid.
05. Evaluation of drug release from semi solid dosage form
06. Relation ship between pH, solubility, partition coefficient and percent ionization of salicylic acid .
07*. Enhancement of dissolution rate by solid dispersion technique
08*. Evaluation of diltiazem hydrochloride conventional and sustained release marketed tablets.
09*. Evaluation of nifedipine conventional tablet & capsule
10. Evaluation of disintegration and dissolution rate of commercial tablets
11. Basic pharmacokinetic calculations
12. Determination of bioavailability of four brands of given drug
13. Determination of absorption rate constant by Wagner-Nelson method
14. Determination of K_E & biological half life from plasma concentration and urinary excretion data
15. Determination of absorption rate constant by method of residuals
16. Preparation of microcapsules of naproxen
17. Calculation of pharmacokinetic parameter as per one compartment model
18. Estimation of renal clearance of creatinine and glomerular filtration rate
19. Determination of construction of standard graph for the estimation of sulphamethoxazole in blood.
20. Determination of biological half-life of rifampicin by urinary excretion data

TEXT BOOKS :

01. Pharmacokinetics by Gibaldi
02. Biopharmaceuticals and Pharmacokinetics by R.E.Notari.
03. Pharmacokinetics by Ritschal
04. Modern Pharmaceutics by G.S.Banker
05. Applied Biopharmaceutics and Pharmacokinetics, Leon Shargel
06. Clinical Pharmacokinetics; Concepts and applications by T.Rowland and Tozer
07. Bioavailability and bioequivalence by Ganesan & Pal.
08. Dissolution , bioavailability and bioequivalence by Hamed M.Abdou.

IV/IV B.PHARMACY (7th Semester)

703 PHARMACOLOGY-II (Theory) (75 hrs.)

Unit : 01

Pharmacology of drugs acting on cardiovascular system : Cardiac glycosides, antihypertensive drugs, coronary dilators, antihyper-lipidemic drugs, antiarrhythmic drugs. Drugs acting on the blood and blood forming agents, coagulants, anticoagulants, haematinics : Iron, Vitamin-B_{12} and folic acid.

Unit : 02

Pharmacology of drugs acting on Respiratory system : Bronchodilators, antitussives and expectorants.

Autocoids: Histamine–antihistaminics, serotonin, serotoninantagonists, prostaglandins.

Unit : 03

Chemotherapy : General principles – Sulphonamides, antibiotics, antiprotozoal drugs, antimalarials, antiamoebic, antifungal and antiviral drugs, chemotherapy of tuberculosis, leprosy and cancer.

Unit : 04

Pharmacology of drugs acting on endocrine system : Thyroid, anti-thyroid drugs, insulin and oral hypoglycemics, glucagon, adrenocortical steroids, pituitary hormones, sex hormones and oral contraceptives.

Unit : 05

Bioassays : General principles of bioassays, Estimation of errors in bioassays. Study of the official biological assay methods of adrenaline, posterior pituitary hormones, insulin, gonadotrophic hormones, test for pyrogens.

Unit : 06

Principles of Toxicology : Poisons, general treatment of poison, systemic antidotes, treatment of insecticide poisoning, heavy metal poisoning, narcotic drug, barbiturate and organophosphorous poisoning. Drug dependence, drug abuse, addictive drugs and their treatment.

IV/IV B.PHARMACY (7th Semester)

704 PHARMACOLOGY-II (Practicals) (75 hrs.)

01. Introduction to basic equipment used in experimental pharmacology
02. Study of mydriatic & miotic effects on rabbit eye
03. Evaluation of local anaesthetic activity by surface anaesthesia method
04. Concentration response curve of acetylcholine
05. Bioassay of acetylcholine by interpolation method
06*. Effect of neostigmine on dose response curve of acetylcholine
07*. Effect of pancuronium on dose response curve of acetylcholine
08*. Three point bioassay method.
09*. Effect of adrenaline and acetylcholine on isolated frog's heart
10*. Effect of calcium chloride and potassium chloride on isolated frog's heart
11*. Effect of adrenaline in presence of a β-blocker on isolated frog's heart
12*. Effect of acetylcholine in presence of atropine on isolated frog's heart

TEXT BOOKS :

01. Goodman and Gilman- "The Pharmacological Basis of Therapeutics"
02. Textbook of Phramacology by Rang and Dale.
03. Quientessence of Medical Pharmacology by C.Chowdary.
04. Lippincott's illustrated reviews : Pharmacology by Richard, D.Howland and MeryJ.Mylek.
05. Basic and clinical pharmacology by Bertran G.Katzung.
06. Review of medical pharmacology by F.H.Meyers, E.Jawetz and A.Goldfien.
07. Essentials of Medical Pharmacology by K.D.Tripathi.
08. Essential of Pharmacotherepeutics by F.S.K.Barar.

"Good things come to those who wait"

IV. B.PHARMACY (7th Semester)

705 PHARMACEUTICAL ANALYSIS –II

(Theory) (75 hrs.)

General treatment of the theory, instrumentation and applications of the following analytical methods.

Unit : 01
Spectrophotometry (UV, Visible, IR), Nephalometry and Turbidimetry, Fluorimetry and Flame Photometry

Unit : 02
Potentiometry and pH metry, conductometry and high frequency titrations, polarography and amperometry.

Unit : 03
Chromatography-introduction, paper chromatography , Thin layer chromatography, Column chromatography, Gas Chromatography and Ion-exchange chromatography.

Unit : 04
High performance liquid chromatography, High performance thin layer chromatography, Electrophoresis and counter current distribution.

Unit : 05
Differential thermal Analysis, Basic Principles of Radio immuno assay and its applications in Pharmaceutical Analysis. Basic theory, instrumentation and applications of Nuclear magnetic resonance spectroscopy.

Unit : 06
Basic Theory, instrumentation and applications of mass spectroscopy, Electron spin resonance spectroscopy and X-ray diffraction.

"The harder you work, the luckier you are"

IV/IV. B.PHARMACY (7th Semester)

706 PHARMACEUTICAL ANALYSIS – II (Practicals) (75 hrs.)

I. Visible Spectrophotometry

01. Determination of absorption maximum for potassium permanganate
02. Estimation of dapsone in tablets by colorimetry
03*. Estimation of sulfamethoxazole in oral suspension by colorimetry
04. Estimation of riboflavine in tablets by colorimetry
05. Estimation of terbutaline in Tablets by colorimetry
06*. Estimation of salbutamol sulphate in tablets by colorimetry
07. Estimation of isoxsuprine HCl in tablets.
08*. Estimation of salbutamol sulphate with Diazo Dapsone reagent
09*. Estimation of terbutaline sulphate with Diazo Dapsone reagent
10. Estimation of isoxsuprine HCl in tablets by colorimetry
11. Estimation of analgine in tablets by colorimetry
12. Estimation of ampicillin in capsules by colorimetry
13. Estimation of metoclopramide HCl in injections by colorimetry.

II. U.V.Spectrophotometry

14. Estimation of paracetamol in tablets by U.V.method.
15. Estimation of ciproflaxacin HCl in tablets by U.V.method

III. Nephelometry

16*. Estimation of sulphates by nephelometry

IV. Potentiometry

17*. Titration of strong acid with a strong base
18. Determination of dissociation constant of weak acid

V. Complexometry

19. Determination of hardness of tap water

VI. Chromatography

20. Identification of aminoacids by paper chromatography
21. Identification of aminoacids by TLC

VII. Karl Fisher Titration

22*. Determination of moisture content by KFR

TEXT BOOKS :

01. Quantitative Pharmaceutical Chemistry by Jenkins
02. A Text Book of Pharmaceutical Analysis by K.A.Connors.
03. Instrumental Methods of Analysis by H.H.Willard.
04. Modern methods of Pharmaceutical Analysis by R.E.Schirmer
05. Instrumental methods of chemical analysis by B.K.Sharma
06. Instrumental methods of chemical analysis by G.R.Chatwal.
07. Practical Pharmaceutical Chemistry by Becket and Stenlake
08. Organic spectroscopy by William Kemp
09. Pharmaceutical Drug Analysis by Ashuthosh Kar.

IV/IV. B.PHARMACY (7th Semester)

707 INDUSTRIAL MANAGEMENT AND PHARMACEUTICAL MARKETING (50 hrs.)

Unit : 01

Elements of Organization and Management : Functions of management

Unit : 02

Plant location and lay-out of an industry : various factors affecting locational aspect, layout of building and equipment product lay-out v/s process layout, drug store location and selection of premises, drug store management.

Unit : 03

Production planning and Control : Scientific purchasing, quality control, problems of productivity, stores organization, location of stores, receiving, inspection of materials, issue from the store, control of stores and stocks, Store Accounting and Records.

Personnel management : Selection, Appointment, training, transfer, Promotion, demotion policies, remuneration, job evaluation , human relations.

Unit : 04

Sales organisation : Market, definition–Determent approaches to the study of marketing, institutional approach, Market planning – Product planning, method of marketing, wholesale retailers, functional approach, cost and efficiency in marketing commodity approach.

Distribution polices : pharmaceutical product marketing, sales promotion policies-Detailing to physician, professional persons, sampling, window and interior display, product advertising , sales promotion, publicity.

Unit : 05

Elementary Industrial Accountancy : Elements of Double entry book Keeping, Books of Accounts-Journal and ledger, cash book. Balance sheet, Profit and Loss Account, Principles of Costing and Estimating.

Unit : 06

Regulatory affairs :

(a) Schedule M of Drugs and Cosmetics act
(b) Drug Development Stages - NDA and NADA filing
(c) ICH guidelines - Introduction.

TEXT BOOKS :

01. Production Management by K.Aswathappa.
02. Marketing Management by Sherlekar.
03. Drug Store Management by Mahesh
04. Pharmaceutical Production and Management by C.V.S.Subrahmanyam
05. Advanced accounts by M.C.Shukla

IV/IV. B.PHARMACY (8th Semester)

801 PHARMACEUTICALCHEMISTRY –V

(NATURAL PRODUCTS)- (Theory) (75 hrs.)

Unit : 01

Carbohydrates : General aspects of mono, di and polysaccharides. Chemistry of glucose, fructose, sucrose and lactose.

Glycosides : Preparation and properties of methyl glycosides. A knowledge of the sources, chemistry and uses of cardiac glycosides and Anthra quinone glycosides, structural elucidation of amygdalin and salicin

Unit : 02

Proteins : An elementary knowledge of the classification and general characteristics of proteins, amino acids and their relationship to proteins. Chemistry of oxytocin, Chemistry and biological significance of purines, uric acid , xanthine bases and nucleic acids.

Unit : 03

Fats and Oils : The extraction, general composition, properties and analysis of fixed oils, fats and waxes.

Terpenes : Occurrence, general methods of isolation and classification of terpenes, Structural features and inter relationship of geraniol, citral, limonene, α-terpineol and menthol. General composition, properties, analysis of essential oils official in I.P. Chemistry and biological significance of flavonoids

Unit : 04

Alkaloids : Classification, general methods of extraction and determination of chemical structure. Quantitative determination of functional groups. Determination of the structures of ephedrine, nicotine and papaverine.

Unit : 05

Steroids and Hormones: Nomenclature, chemistry of ergosterol, cholesterol, bile acids and cortisone, preparation and structures of sex hormones, interrelationship of estradiol, estrone and estroil . Synthesis of progesterone, irradiation of ergosterol and preparation and properties of thyroid hormones.

Unit : 06

Vitamins : Classification, determination of structures of thiamine, riboflavin and ascorbic acid , skeleton structures of vitamins official in I.P. A study of their properties, stability and uses

IV/IV. B.PHARMACY (8th Semester)

802 PHARMACEUTICAL CHEMISTRY – V

(NATURAL PRODUCTS) (Practicals) (75 hrs.)

01*. Determination of acid value of fixed oil
02*. Determination of saponification value of a fixed oil
03. Determination of ester value of oil
04*. Determination of iodine value of oil

Volatile Oils

01*. Determination of cinnamic aldehyde in cinnamon oil
02. Determination of eugenol in clove oil
03. Qualitative analysis of natural products (Comprises of amino acids, carbohydrates, proteins, alkaloids, glycosides, steriods, flavonoids)
04. Isolation of casein from the milk
05. Isolation of piperine from black pepper powder
06*. Estimation of ephedrine hydrochloride by non aqueous titrimetry
07*. Estimation of quinine sulphate
08*. Extraction of caffeine from tea dust.

TEXT BOOKS :

01. Organic Chemistry - Vol. II by I.L.Finar
02. Organic, Pharmaceutical and Medicinal Chemistry by Wilsonand Gisvold.
03. Remington's Text Book of Pharm. Sciences.
04. Text book of Medicinal Chemistry by A.Burger
05. Rama Rao Nadendla, Pharmaceutical Organic Chemistry, (Chemistry of Heterocyclic and Natural Compounds), Vallabh Publications, New Delhi
06. Organic chemistry of natural products by Gurdeep chatwal, volume I & II.
07. Organic chemistry of natural products by O.P.Agharwal volume I & II.

"Wisdom is the wealth of the wise"

IV/IV. B.PHARMACY (8th Semester)

803 PHARMACOGNOSY- II (Theory) (75 hrs.)

Systematic pharmacognostic studies of following categories of crude drugs

Unit : 01

Glycosides : Aloes, Ammi, Brahmi, Buckwheat, Cantharides, Cascara, Chirata, Digitalis, Dioscorea, Gentian, Ginseg, Kalmegh, Liquorice, Psoralea, Quassia, Senna, Rhubarb, Squill, Strophantus, Wild Cherry bark.

Unit : 02

Alkaloids : Aconite, Belladona, Cinchona, Colchicum, Datura, Duboisia, Ephedra, Ergot, Hyoscyamus, Ipecac, Kurchi, Lobelia, Nux-vomica, Opium, Rauwolfia, Solanum khasianum, Vasaka, Vinca, Withania.

Unit : 03

Volatile oils : Bitter orange peel, Caraway, Cardamom, Cassia, Cinnamon, Citronella, Civet, Clove, Corriander, Dill, Eucalyptus, Fennel, Gaultheria, Lemonpeel, Musk, Nutmeg, Palmarosa, Peppermint, Saffron, Sandal wood, Tulsi, Vetiver.

Unit : 04

Historical development of plant tissue culture; types of cultures -a study of callus culture and cell suspension. Culture, nutritional requirements, growth and their maintenance. Applications of plant tissue culture in production of pharmaceutically important secondary metabolites.

Unit : 05

A study of the following Ayurvedic drugs, (Botanical source, chemical constituents, pharmacological actions and uses)

01. Amla (Phyllanthus emblica)
02. Bheda (Terminalia belerica)
03. Kantkari (Solanum xanthocarpum)
04. Malkangni (Celactrus panicula)
05. Tylophera(Tylophora indica)
06. Sataver(Asparagus recomosus)
07. Bhilawa(Semecarpus anacardium)
08. Kalijiri(Vernonia anthelmintica)
09. Kaner(Nerium indicum)
10. Punarnava (Bocrhaevic diffuca)
11. Sankhapushpi

Unit : 06

Lipids : Bees wax, Castor oil, Cocoa butter, Cod-liver oil, Hydnocarpus oil, Kokum butter, Lard, Linseed oil, Rice bran oil, Skark liver oil and wool fat.

IV/IV. B.PHARMACY (8th Semester)

804 PHARMACOGNOSY - II (Practicals) (75 hrs.)

I*. Study of Morphology and transverse section of the crude drugs.

a.	Fennel	b.	Clove	c.	Coriander
d.	Nuxvomica	e.	Cinnamon	f.	Cinchona
g.	Dill	h.	Ephedra	i.	Ipecac
j.	Senna	k.	Vasaka	l.	Vinca

II. Identification of powdered crude drugs based on their microscopical characters.

a.	Senna	b.	Vasaka	c.	Ginger
d.	Cinchona	e.	Cinnamon	f.	Squill
g.	Rauwolfia	h.	Kurchi	i.	Naxvomica
j.	Quassia				

III*. Identification powdered crude drugs (Listed in II) in their mixtures based on microscopical characters.

IV. Aseptic seed germination (Trigonella seeds)

V. Callus initiation and establishment (Catharantus roses leaves)

VI. Morphology of crude drugs

01.	Fennel	02.	Clove	03.	Coriander
04.	Cardamom	05.	Nuxvomica	06.	Cinnamon
07.	Cinchona	08.	Dill	09.	Quassia
10.	Ephedra	11.	Senna	12.	Vinca
13.	Datura	14.	Tulsi	15.	Nutmeg
16.	Peppermint oil	17.	Lemon peel	18.	Aconite
19.	Ashwagandha	20.	Kurchi	21.	Rauwolfia
22.	Dioscorea	23.	Arjuna	24.	Chirata
25.	Squill	26.	Gentian	27.	Ginger
28.	Turmeric	29.	Glycerrhiza	30.	Amla
31.	Ipecac	32.	Bitter Orange Peel		

TEXT BOOKS :

01. Tyler, V.C.,Brady, L.R. and Robbers, J.E. "Pharmacognosy" 8th Ed., Lea and Febiger, Philadelphia.
02. Text Book of Pharmacognosy by T.E.Wallis.
03. Trease, G.E. and Evas, W.C., "Pharmacognosy" 11th and 12th editions, Bailliere Tindall, U.K.
04. Kokate, C.K., Purohit A.P. and Gokhale, S.B., "Pharmacog nosy" Nirali Prakashan, 1990.
05. Ross, M.S.F. and Brain, K.R., "an Introduction to Phytopharmacy Pitman Medical-Kent.
06. Indian Material Medica by A.K.Nadkarni
07. Essentials of Pharmacognosy by Dr.S.H.Ansari.
08. Pharmacognosy and Phytochemistry by Ashutoshkar.

IV/IV. B.PHARMACY (8th Semester)

805 GOOD MANUFACTURING PRACTICES AND VALIDATION

(Theory) (50 hrs)

Unit : 01

Concepts and Philosophy of Good Manufacturing Practice (GMP). Brief introduction of CGMP.

Unit : 02

Concepts and Philosophy of Validation. Validation methods of equipment

Unit : 03

Validation methods of water supply systems, deionised and distilled water and water for injection.

Unit : 04

Calibration of Analytical Instruments (A brief introduction). Calibration of Spectrophotometer and HPLC instrument as per ICH guidelines.

Unit : 05

Sampling Techniques, Computer applications in GMP and GLP, Statistical quality control and control charts.

Unit : 06

Concepts and Philosophy of GLP, SOP, ICH and ISO-9000.

TEXT BOOKS :

1. Good Manufacturing practice (GMP) - Mehra
2. How to practice GMP - PP Sharma
3. Quality Assurance of Pharmaceuticals (Vol-1 and 2, Pharma Book syndicate, Hyderabad)
4. A Guide to total quality management - K Maitra and S K Ghosh
5. Quality Assurance and Quality Management in pharmaceutical Industry-Y Anjaneyulu and R.Marayya.
6. ISO 9000 and Total Quality Management - S K Ghosh.
7. Quantitative Analysis of Drugs in Pharmaceutical Formulations-P.D.Sethi.

"Experience is the hardest teacher. She gives the test first and the lesson afterwards"

14. MODEL QUESTION PAPERS

For 1st B. Pharmacy

I st B. Pharmacy -2014

P-71 **B.Ph 101 A**

Total No. of Questions : 18] [Total No.of Pages : 02

I/IV B. PHARMACY DEGREE EXAMINATIONS, AUGUST-2014

(1st & 2nd Semesters)

101 A : MATHEMATICS

Time : **Three Hours** Maximum : **70 marks**

SECTION - A

Answer any FOUR questions. **(4x10=40 marks)**

1. Using the Cramer's rule solve the system of equations

   $5x - 6y + 4z = 15$

   $7x + 4y - 3z = 19$

   $2x + y + 6z = 46$

2. a) A straight line with slope 1 passes through a point P=(-3,5) and meets the straight line $x+y-6=0$ at Q. Find the distance PQ.

   b) Show that the points (1,2), (-3, 4) and (7,-1) are collinear.

3. a) If $x^3+y^3 = 3axy$ find $\frac{dy}{dx}$.

   b) If $y = (\log x)^{\tan x}$ find $\frac{dy}{dx}$.

4. If $f(x)=\frac{e^{\frac{1}{x^2}}+1}{e^{\frac{1}{x^2}}-1}$ is continuous at $x=0$ find f (0).

5. Find $\int \frac{1}{2\cos x+3\sin x+4}\,dx$.

6. Solve $\left(1+e^{\frac{x}{y}}\right)dx+e^{\frac{x}{y}}\left(1-\frac{x}{y}\right)dy=0$

SECTION - B

Answer any TEN questions. **(10x3=30 marks)**

7. Find which term of the geometric progression 5, 10, 20, 40, ... is 5120.

8. Resolve into partial fractions $\frac{2x+3}{(x+3)(x+1)}$.

9. Find the area of the triangle with vertices (-1,6), (-3,9) and (1,-3).

P.T.O.

10. A straight line through origin 0 meets the parallel lines $4x+2y=9$, $2x+y+6=0$ at P and Q find the ratio at which 0 divides P and Q.

11. If $y = (\text{Tan}x)^{\text{Sin}x}$ find $\frac{dy}{dx}$.

12. Show that $\underset{x\to 0}{Lt} \frac{Sin\,x}{x} = 1$.

13. Find $\underset{x\to 0}{Lt} \frac{7x^3-8x^2+3}{2x^3+10x^2-20}$.

14. Evaluate $\int x^3 e^x\,dx$.

15. Find the area bounded by the two parabolas $y^2 = 16x$, $x^2 = 16y$.

16. Solve $ydx-xdy=\sqrt{x^2+y^2}\,dx$.

17. Solve $\int \frac{1}{4+t^2}\,dt$.

18. Find the Laplace transform of Sin2t Cos3t.

P-72 **B.Ph 101 B**

Total No. of Questions : 18] [Total No.of Pages : 01

I/IV B. PHARMACY DEGREE EXAMINATIONS, AUGUST-2014

(1st & 2nd Semesters)

101B : BIOLOGY

Time : **Three Hours** Maximum : **70**

SECTION - A

Answer any FOUR questions. **(4x10=40 marks)**

1. Explain the Cell Structure.
2. Describe the structure and life history of Bacteria.
3. Write the characteristic features and medicinal importance of plants belonging to the family Umbelliferae.
4. Describe the Morphological and Anatomical characters of Monocot root.
5. Explain the structure and Physiology of Earthworm.
6. Write the structure and life history of Entamoeba

SECTION - B

Answer any TEN questions. **(10x3=30 marks)**

7. Write the differences between plants and animals.
8. Explain cell inclusions in brief.
9. Describe the salient features of Gymnosperms.
10. Write the characteristic features of Dicots.
11. Mention any three medicinal plants of Solanaceae with their economic importance.
12. Write the general floral characters and floral formula of Solanaceae.
13. Write the special types of inflorescence.
14. Describe a few types of fruits with examples.
15. Write the salient features of Vertebrates.
16. Explain the important features Reptiles.
17. Describe the structure of Plasmodium.
18. Write the life history of Trypanosoma.

P-73 B.Ph 102

Total No. of Questions : 18] [Total No.of Pages : 01

I/IV B. PHARMACY DEGREE EXAMINATIONS, AUGUST-2014

(1st & 2nd Semesters)

102 : PHARMACEUTICAL CHEMISTRY - I

Time : **Three Hours** Maximum : **70 Marks**

SECTION - A

Answer any FOUR questions. (4x10=40 marks)

1. What are electrophiles and nucleophiles. Give examples and explain the structure and properties of Nucleophiles.
2. Discuss the stability of conjugated dienes. By taking suitable examples, explain the 1, 2 addition reactions of conjugated dienes.
3. By taking suitable examples, explain the oxidation reactions of alcohols. Write the properties of rectified spirit.
4. What are SN_1 and SN_2 reactions ? Explain SN_1 reaction Mechanism and write the factors affecting SN_1 reaction.
5. Explain the mechanism of Aldol condensation and perkin reaction.
6. Write the preparation and uses of Melonic ester and acetoacetic ester.

SECTION - B

Answer any TEN questions. (10x3=30 marks)

7. Explain inductive effect on organic reactions.
8. Explain polymerization reactions of alkynes.
9. Explain Markovnikovs' rule.
10. Explain Hoffmann's Elimination reaction.
11. Discuss the reactivity of alkyl halides.
12. Write the classification of Carbonyl compounds with examples.
13. What is Grignard reagents and write its applications.
14. Write Reformatsky reaction.
15. Write the preparative methods of amides.
16. Explain HVZ reaction.
17. What is Ozonolysis ? Give examples for ozonolysis reactions.
18. What is Bayer's Strain Theory.

P-74 B.Ph 104

Total No. of Questions : 18] [Total No.of Pages : 01

I/IV B. PHARMACY DEGREE EXAMINATIONS, AUGUST-2014

(1st & 2nd Semesters)

104 : PHYSICAL PHARMACY - I

Time : **Three Hours** Maximum : **70 Marks**

SECTION - A

Answer any FOUR questions. **(4x10=40 marks)**

1. Write the important postulates of Kinetic Theory of gases. Explain the differences between solid state and crystalline state.
2. State Second Law of Thermodynamics. Explain carnot cycle with a neat diagram.
3. Explain the principle of optical rotatory Dispersion. How ORD is useful in the study of chirality of molecules ?
4. How do you determine the molecular weight of a solute by depression in freezing point method ?
5. How do you prepare Sorenson's Phosphate Buffer (0.1 mol/L) ? Write the determination of pH by graphical method.
6. How do you determine the viscosity of a liquid by Ostwald's viscometer method ?

SECTION - B

Answer any TEN questions. **(10x3=30 marks)**

7. Name seven crystal lattice systems.
8. Write and explain the terms involved in phase rule.
9. Define the terms Heat of cumbuston and Heat of reaction.
10. Define Dipole moment and write its units.
11. How do you express the normality and Normality of Phosphoric acid ?
12. What is an ideal solution and real solution ?
13. Define an isotonic system. Give examples.
14. How do you determine the toxicity of a drug substance ?
15. Explain the construction of an Electro-chemical cell ?
16. Draw and explain Jablenski diagram.
17. Write and explain the terms involved in Poisseulti's formula.
18. Define Binding force in molecules.

P-75 B.Ph 106

Total No. of Questions : 18] [Total No.of Pages : 01

I/IV B. PHARMACY DEGREE EXAMINATIONS, AUGUST-2014

(1st & 2nd Semesters)

106 : COMPUTER APPLICATIONS AND STATISTICAL METHODS

Time : **Three Hours** Maximum : **70 Marks**

SECTION - A

Answer any FOUR questions. **(4x10=40 marks)**

1. Describe the anatomy of a characteristic Table.
2. Explain the utility of the following statements in Basic Language.
   (a) IF-THEN (b) FOR-NEXT (C) WHILE-WEND
3. Write the applications of computers in Pharmacy.
4. Explain collection and Pictorial representation of Data.
5. Explain student 'F' test.
6. Explain method of least squares.

SECTION - B

Answer any TEN questions. **(10x3=30 marks)**

7. What are super computers ? Write its applications in Pharmaceutical Industry.
8. Explain the Terms STOP and END statements.
9. What is meant by hirarchy of operations ?
10. Explain GOTO statement.
11. Write the basic steps in 'C' language.
12. Explain an Array.
13. Explain BREAK and CONTINUE statements.
14. Define the Terms accuracy and precision.
15. Define standard deviation and variance.
16. What is determinate error and Random error ?
17. Define probability and standard error.
18. Define correlation coefficient.

P-76 B.Ph 201

Total No. of Questions : 18] [Total No.of Pages : 01

I/IV B. PHARMACY DEGREE EXAMINATIONS, AUGUST-2014

(1st & 2nd Semesters)

201 : PHARMACEUTICS - I

Time : **Three Hours** Maximum : **70 Marks**

SECTION - A

Answer any FOUR questions. **(4x10=40 marks)**

1. Explain the History and Evolution of Pharmacy. Make a comparison between Pharmacopia of India and any other country.
2. Define Dosage. Describe the essential characteristics of different dosage forms. Why flavouring agents are added to liquid dosage forms ?
3. Write the preparation and uses of commonly used syrups and solutions.
4. Write the method of preparation and uses of ear drops and Nasal drops.
5. Describe the principle and applications of Maceration. Write the preparation of Tinctures of I.P. and B.P.
6. Write the classification of powders and preparation of some commonly used powders.

SECTION - B

Answer any TEN questions. **(10x3=30 marks)**

7. Why Pharmacy can be taken as a profession ?
8. What are Isotonic solutions ? Give some examples.
9. Write about the labelling requirements for Medicines.
10. What are Antioxidants ? Write its applications.
11. Write the preparation of Aromatic waters.
12. What are dry syrups ? Give examples and write few applications of Dry syrups.
13. Define 'Suspension' and 'Emulsion'. Give one example each.
14. Write about the liquids for external use.
15. What is the principle of hot extraction.
16. Write the preparation of Tincture (I.P.).
17. Write briefly about cachets.
18. Write about the packaging of pessaries.

P-77 B.Ph 203

Total No. of Questions : 18] [Total No.of Pages : 01

I/IV B. PHARMACY DEGREE EXAMINATIONS, AUGUST-2014

(1st & 2nd Semesters)

203 : PHARMACEUTICAL ANALYSIS - I

Time : **Three Hours** Maximum : **70 Marks**

SECTION - A

Answer any FOUR questions. **(4x10=40 marks)**

1. Explain the terms Molarity, Normality and Morality. How do you convert the concentrations of H_2SO_4 and H_3PO_4 from Molarity into Normality ?
2. What is the importance of limit test in pharmaceutical substances ? Write the procedure for the limit tests of sulphate and iron.
3. What are the important points for the selection of a primary standard substance. Write about the usage of indicators in precipitation methods with examples.
4. Write the method of precipitation in Gravimetric analysis with examples.
5. Explain the theory of Complexometric Titration by EDTA as an example.
6. Discuss the importance of Good Laboratory Practices (GLP) in Pharmaceutical Analysis.

SECTION - B

Answer any TEN questions. **(10x3=30 marks)**

7. Name different types of pipettes and their sensitivities.
8. How do you determine the percentage purity of substance ?
9. Write any one special procedure for limit test.
10. Explain common ion effect with an example.
11. Explain Diazonium titrations.
12. What is co-precipitation and post-precipitation ?
13. Explain digestion process in the Gravimetric analysis.
14. What is masking agent ? Explain with one example.
15. Write the applications of Non-aqueous titrations.
16. How do you determine moisture content in Pharmaceutical sample ?
17. Write about gas samplers.
18. How do you minimize errors in Analytical experiments ?

P-78 B.Ph 205

Total No. of Questions : 18] [Total No.of Pages : 01

I/IV B. PHARMACY DEGREE EXAMINATIONS, AUGUST-2014

(1st & 2nd Semesters)

205 : ENVIRONMENTAL STUDIES

Time : **Three Hours** Maximum : **70 Marks**

SECTION - A

Answer any FOUR questions. **(4x10=40 marks)**

1. Describe the characteristic features, structure and functions of rivers.
2. Discuss the use and over exploitation of Forest resources. What is the effect of Mining on forests.
3. Write a detailed note on Environmental Impact Assessment.
4. Describe the Coastal Zone regulation Environmental Act of Government of India.
5. Write the deliberations of World Commission for Environmental Development (WCED).
6. Write a detailed case study on Kolleru Lake - Aquaculture.

SECTION - B

Answer any TEN questions. **(10x3=30 marks)**

7. What is the importance of Environment ?
8. What are the functions of Deserts.
9. Write the benefits of dams.
10. What are Energy needs ?
11. Explain the limits of Growth.
12. What is the population growth on environment ?
13. Write the main points of Wild life protection Act.
14. Write the important points of Earth Summit 1992.
15. Explain Chipko Movement.
16. Write the structure of Grass land.
17. What is Soil erosion ?
18. Discuss the effects of modern agriculture.

15. CELEBRATIONS IN THE COLLEGE

NATIONAL YOUTH DAY	12th JAN
REPUBLIC DAY	26th JAN
NATIONAL SCIENCE DAY	28th FEB
WOMEN'S DAY	8th MARCH
WORLD HEALTH DAY	7th APRIL
WORLD ENVIRONMENT DAY	5th JUNE
WORLD DIABETES DAY	27th JUNE
WORLD PEACE DAY	6th AUG
INDEPENDENCE DAY	15th AUG
TEACHER'S DAY	5th SEP
NSS FOUNDATION DAY	24th SEP
WORLD SERVICE DAY	9th NOV
WORLD STUDENT'S DAY	17th NOV

16. IMPORTANT EVENTS IN THE COLLEGE

ANNUAL DAY	:	2nd week of February
FAREWELL DAY	:	4th week of April
NATIONAL PHARMACY WEEK	:	3rd week of November
FRESHERS DAY	:	4th Week of November
SEMI CHRISTMAS	:	23rd December
SPORTS MEET	:	4th week of December

Sports Meet Inauguration

17. OTHERS

17.1 The Oath of a Pharmacist

At this time, I vow to devote my professional life to the service of all humankind through the profession of pharmacy.

I will consider the welfare of humanity and relief of human suffering my primary concerns.

I will apply my knowledge, experience and skills to the best of my ability to assure optimal drug therapy outcomes for the patients I serve.

I will keep abreast of developments and maintain professional competency in my profession of pharmacy.

I will maintain the highest principles of moral, ethical and legal conduct.

I will embrace and advocate change in the profession of pharmacy that improves patient care.

I take these vows voluntarily with the full realization of the responsibility with which I am entrusted by the public.

17.2 NATIONAL ANTHEM

Jana-Gana-Mana
Jana-Gana-Mana-Adhinayaka,
Jaya He
Bharata-Bhagya-Vidhata
Punjab-Sindhu-Gujarata-Maratha
Dravida-Utkala-Banga
Vindhya-Himachala-Yamuna-Ganga
Uchchhala-JaladthaTaranga
Tava Subha Name Jage
Tava Subha Ashisa Mage
Gahe Tava Jaya Gatha.
Jana-Gana-Mangala Dayaka, Jaya He
Bharata-Bhagya-Vidhata,
Jaya He, Jaya He, Jaya He,
Jaya, Jaya, Jaya, Jaya He.

17.3 COLLEGE SONG

Hearty welcome we wish to you - (2)
We the nirmalites wish you
A cheerful and hearty welcome
Hearty welcome to you - (4)
Bright shining of the sun,
Cold blowing is the wind,
The blooming flowers are wishing something. - (Hearty)
Sweet singing of the birds,
The tumbling of the words,
We joslygather to wish ou heartflly - (Hearty)

17. 4 COLLEGE PRAYER

Our Father in heaven, hallowed be your name.
Your kingdom come,
Your will be done,
On earth, as it is in heaven.
Give us today our daily bread,
Forgive us our sins as we forgive those who sin against us do not bring us to the test but deliver us from evil. Amen!

17.5 PATRIOTIC SONGS
Vande Maataram..

Vande Maataram..
Vande Maataram..

Sujalaam Sufalaam Malayaj Sheetalaam
Sasyashyaamalaam Maataram
Vande Maataram..

Shubhrajyotsna Pulakit Yaaminiim
Phulla Kusumita Drumadal Shobhiniim
Suhaasinim Sumadhura Bhaashhinim
Sukhadaam Varadaam
Maataram.. Vande Maataram, Vande Maataram..

Sare Jahan Se Accha Hindustan Hamara

Sare jahan se accha hindostan hamara
Hum bulbulain hai iss ki yeh gulsitan hamara
Sare jahan se accha

Parbat voh sab se uncha hamsaya asman ka
Voh santari hamara voh pasban hamara

Sare jahan se accha hindostan hamara
Ham bulbulain hai is ki yeh gulsitan hamara