KRISHNA UNIVERSITY
MACHILIPATNAM
B.PHARM SYLLABUS COURSE STRUCTURE & SYLLABUS
(With Effect from the Academic Year 2012-13)(R2012)

GRADING SYSTEM & REGULATIONS:

1. Admission, instruction and attendance

2. Examinations: Sessional and Year-end

3. Declaration of results and classification

4. Practical training.

5. Guidelines for paper setting

1.1 The degree of Bachelor of Pharmacy of Krishna University will be conferred on a candidate who has satisfied the following conditions.

1.2. The Candidate must have passed the (i) Intermediate examination of the Board of Intermediate Education, Government of Andhra Pradesh or Diploma in Pharmacy Examination of the Dept. of Technical Education, Govt. of Andhra Pradesh or any other examination recognized by the academic senate as equivalent thereto with Physics, Chemistry and Mathematics or Biology as group subjects and must have qualified in the Entrance Exams as prescribed by the University for being eligible to join I semester of B.Pharm course.

1.3.1 The Candidate must have, after passing the qualifying examination pursued a regular course of study for not less than four academic years (three academic years in the case of diploma in pharmacy holders who are admitted directly in to 2nd year (3rd semester of B.Pharm) and satisfied the academic requirements as prescribed thereafter. The scope of subject matter in each course and periods of study shall be as indicated in the syllabus and the scheme of instruction.
1.3.2 Instruction and examination in each academic year is spread over two semesters with a minimum of 90 working days in each semester (180 in any given academic year).

1.4. 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 practicals, 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 9% 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., Intercollegiate tournaments conducted by Krishna 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 may be deemed to have attended the college during the period solely for the purpose of the examination.

1.5 A candidate who cannot satisfy the attendance requirements in clause 1.5 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).

1.6 If any candidate fails to satisfy the regulation under 1.5 or 1.6 she/he shall not be allowed for the university Examinations at the end of the semester, and she/he shall not be allowed for promotion to the next higher class of study. She/he shall be required to repeat the regular course of study of that academic semester along with the next regular batch.

2.0 Assessment for the award of degree shall consists of (a) Internal evaluation for 30 marks in each of the theory and practical courses separately except in course 101 B and C Biology theory and practical (bridge course). For course 101 B and C the sessional marks shall be 15 and 15 respectively as detailed in the scheme of examination for 70 marks in each of the theory and practical, except for 101 B and C Biology theory and practical (bridge course) for which the semester-end examination marks shall be 35 and 35 respectively.

2.1 Regulations concerning sessional examination: (a) There shall be three sessional examinations and one online examination in each theory course Half of the three sessional and one fourth of the online exam, five marks for marks for attendance and five marks for seminar (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
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.

2.2 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 and the setting and evaluation shall be done jointly by two examiners, one
internal and one external. The duration of the practical examination may be of 4 to 6 hours as
prescribed. There shall be no supplementary examination except for the final semester-end
examinations. A candidate shall not be allowed to appear for the sixth semester end examination
unless he passes in all the courses of the first and second semester end examinations and the
eighth semester-end examinations unless he passes in all the courses of the third and fourth
semester-end examinations.

3.1 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.

3.1a. 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.

3.1b. 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. Candidates with Diploma in Pharmacy have to take
course 101 (A) Mathematics. The respective candidates shall have to pass in these courses. The
marks awarded in these courses shall not be considered for calculation of SGPA and CGPA.

3.2 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.

4.0 Every candidate shall undergo practical training for at least one month in pharmaceutical
Industry /Pharmaceutical concern / hospital / clinical lab any time after the end of the sixth
semester of the course.
GRADATION SYSTEM:
Appropriate letter grades are awarded in each theory and practical subject to only such candidates who have passed in the university examinations. Internal assessment marks and university examination marks put together will be taken into account for the letter grading system in each subject separately.
A Candidate registered for the university examination but fails to appear or fails to score the minimum required 40% marks in the university examination will get a grade ‘F’, indicating failure or grade of incompletion.
A subject successfully completed cannot be repeated. Final evaluation of each subject (theory and practical separately) will be carried out on a 10-point grading system corresponding to the marks obtained in that subject. Each subject letter grade is converted into a specific grade value associated with the letter grade as given below (Table).

**Performance in a paper**

(Conversion of marks to grade points and letter grade)

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Range of Marks</th>
<th>Grade Points</th>
<th>Letter Grade</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>&gt;85%</td>
<td>10.0</td>
<td>O</td>
</tr>
<tr>
<td>2</td>
<td>75%-85%</td>
<td>9.0</td>
<td>A</td>
</tr>
<tr>
<td>3</td>
<td>67%-74%</td>
<td>8.0</td>
<td>B</td>
</tr>
<tr>
<td>4</td>
<td>58%-66%</td>
<td>7.0</td>
<td>C</td>
</tr>
<tr>
<td>5</td>
<td>50%-57%</td>
<td>6.0</td>
<td>D</td>
</tr>
<tr>
<td>6</td>
<td>40%-49%</td>
<td>5.0</td>
<td>E</td>
</tr>
<tr>
<td>7</td>
<td>&lt;40%</td>
<td>0.0</td>
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</table>
Calculation of SGPA and CGPA

The Semester Grade Point Average (SGPA) = \( \frac{\sum (C \times GP)}{\sum C} \)

The Cumulative Grade Point Average (CGPA) = \( \frac{\sum (C \times GP)}{\sum C} \)

Where, \( C = \) Credits of the Subject \( GP = \) Grade Points of the Subject

SGPA is calculated considering only the subjects of that semester.

CGPA is calculated considering all the subjects.

Overall Performance

(Conversion of CGPA to grade and classification of final result)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Range of CGPA</th>
<th>Grade</th>
<th>Classification of final result</th>
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<tbody>
<tr>
<td>1</td>
<td>8.00 to 10.00</td>
<td>O</td>
<td>First Class with Distinction</td>
</tr>
<tr>
<td>2</td>
<td>6.50 to &lt; 8.00</td>
<td>A</td>
<td>First Class</td>
</tr>
<tr>
<td>3</td>
<td>5.50 to &lt; 6.50</td>
<td>B</td>
<td>Second Class</td>
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<td>5</td>
<td>&lt; 5.50</td>
<td>D</td>
<td>Re-appear</td>
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5. Guidelines for paper setting-

The regulations regarding the paper setting and evaluation procedures will be as per the general regulations adopted by the university.
# Scheme of Instruction & Examination with Effect from 2012-13 Academic Year

## I/IV B.PHARM 1st Semester

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Subject</th>
<th>Periods per week</th>
<th>Exam. Duration (hrs)</th>
<th>Marks</th>
<th>TOTAL</th>
<th>Credits</th>
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<td>3</td>
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<td>105</td>
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</tr>
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<td>Computer Applications and Statistical Methods. (Theory)</td>
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NC = No Credit.
### I/IV B.PHARM 2nd SEMESTER-

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<th>SUBJECT</th>
<th>Periods per week</th>
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<td>Practical</td>
<td>Sessi</td>
<td>Semester</td>
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### I/IV B.PHARM 3rd SEMESTER-

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<th>Marks</th>
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<td>Semester</td>
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<tr>
<td>304</td>
<td>Pharmaceutical Microbiology (Theory)</td>
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<td>-</td>
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<td>305</td>
<td>Pharmaceutical Microbiology (Practicals)</td>
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<td>4</td>
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<tr>
<td>306</td>
<td>Anatomy &amp; Physiology (Theory)</td>
<td>6</td>
<td>-</td>
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<td>307</td>
<td>Anatomy &amp; Physiology (Practicals)</td>
<td>-</td>
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<td>18</td>
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### II/IV B.PHARMACY 4th SEMESTER

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<td>Pharmaceutical Chemistry-III (Medicinal-I) (Theory)</td>
<td>6 -</td>
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<tr>
<td>402</td>
<td>Physical Pharmacy-II (Theory)</td>
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<tr>
<td>403</td>
<td>Physical Pharmacy-II (Practical)</td>
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<td>4</td>
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<td>404</td>
<td>Applied Biochemistry &amp; Clinical Pathology (Theory)</td>
<td>6 -</td>
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<td>405</td>
<td>Applied Biochemistry &amp; Clinical Pathology (Practicals)</td>
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<td>4</td>
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<td>406</td>
<td>Forensic Pharmacy (Theory)</td>
<td>4 -</td>
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<tr>
<td>407</td>
<td>English &amp; Communication Skills (Language Laboratory) (Practicals)</td>
<td>- 6</td>
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### III/IV B.PHARMACY 5th SEMESTER

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<td>6 -</td>
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<td>502</td>
<td>Pharmaceutical Chemistry-IV Medicinal-II Practical</td>
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<tr>
<td>503</td>
<td>Pharmaceutics-II (Dosage form Technology Including Cosmetics) (Theory)</td>
<td>6 -</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>504</td>
<td>Pharmaceutics-II (Dosage form Technology Including Cosmetics) (Practicals)</td>
<td>- 6</td>
<td>6</td>
<td>30</td>
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<tr>
<td>505</td>
<td>Pharmacognosy-I (Theory)</td>
<td>6 -</td>
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<td>506</td>
<td>Pharmacognosy-I (Practicals)</td>
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### III/IV B.PHARMACY 6th SEMESTER
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<th>Course No.</th>
<th>SUBJECT</th>
<th>Periods per week</th>
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<td>601</td>
<td>Pharmaceutics -II (Theory)</td>
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<td>Pharmaceutical Biotechnology (Practicals)</td>
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<td>Hospital and Clinical Pharmacy (Theory)</td>
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<td>606</td>
<td>Hospital and Clinical Pharmacy (Practicals)</td>
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**IV/IV B.PHARMACY 7th SEMESTER**

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<th>Exam. Duration (hrs)</th>
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<tbody>
<tr>
<td>701</td>
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<td>Pharmaceutics –III (Biopharmaceutics, Pharmacokinetics &amp; New Drug Delivery Systems) (Practicals)</td>
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<td>Industrial Management and Pharmaceutical Marketing (Theory)</td>
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**IV/IV B. PHARMACY 8th SEMESTER**

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<td>Pharmacognosy-II (Theory)</td>
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**TOTAL NUMBER OF CREDITS AT THE END OF COURSE:**

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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, Coordinates 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, 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.

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

<table>
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<tr>
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<th>Differential Calculus</th>
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<td>Integral Calculus</td>
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<td>N.Krishnamurthy</td>
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<td>B.V.S.S.Sarma</td>
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<td>4.</td>
<td>Differential Equations and their applications</td>
<td>:</td>
<td>Jafar Ahsan</td>
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**I/IV B.PHARMACY ( 1st SEMESTER)**

**MODEL QUESTION PAPER**

101(A)( Theory), MATHEMATICS

**Time:** 3 Hours  
**Max. Marks:** 70M

Answer All the questions. All The questions carry equal Marks.

1. a) Find $5 + 55 + 555 + \ldots \ldots$
   b) Find the coefficient of $x^4$ in $(x - \frac{1}{x})^{12}$

(OR)
a) If \( A = \begin{pmatrix} 3 & 2 & 0 \\ 1 & 4 & 0 \\ 0 & 5 & 0 \end{pmatrix} \), then show that \( A^2 - 7A + 10I = 0 \).

b) Solve the equations by Cramer’s rule.

\[
\begin{align*}
\ x + y + z &= -1, \\
\ x + 3y + 4z &= -6, \\
\ x + 2y + 3z &= -4.
\end{align*}
\]

2. a) If the distances from \( P \) to the points \((2, 3), (2, -3)\) are in the ratio \(2:3\), then find the locus of \( P \).

b) Show that the points are collinear.

(OR)

a) Show that the points \((2, 3), (5, 4), (8, 5)\) lie on a line and find the equation of the line.

b) Find the point of intersection of the lines \(7x + 2y - 8 = 0\),

\[
3x - 5y - 21 = 0.
\]

3. a) \( \lim_{x \to 1} \sqrt{1 + x} - \sqrt{1 - x} \)
b) Find the derivative of $x^2$ from first principle

(OR)

\[ \frac{dy}{dx} \]

a) Find \[ \frac{dy}{dx} \] , Where $y = x^3 e^x$  

\[ \frac{dy}{dx} \cos x \]

b) Find \[ \frac{dy}{dx} \] , Where $y = \frac{1}{x^2}$  

\[ \frac{dy}{dx} \]

4 a) Find \[ \frac{dy}{dx} \] , Where $y = e^{\sin x}$  

\[ \frac{dy}{dx} \]

b) Find \[ \frac{dy}{dx} \] , Where $y = x^x$  

\[ \frac{dy}{dx} \]

(OR)
\[
\frac{\partial^2 u}{\partial y \partial x} \quad \frac{\partial^2 u}{\partial y \partial x}
\]
a) Find where \( u = x^2 + y^2 \).

b) Find the interval in which the following function is increasing or decreasing where \( f(n) = 2x^2 - 3x + 4 \).

\[
aX^2 + bx + c
\]
5 a) Evaluate \( \int \frac{x^2}{x^2} \ dx \).

b) Evaluate \( \int x^2 + 5x + 6 \ dx \).

(OR)

a) Evaluate \( \int xe^x \ dx \).

b) Find the order & degree of the differential equation
Krishna University. B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)
I/IV B.PHARMACY (1st SEMESTER)
101B 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).

Parasitology: Introduction, Entamoeba, Plasmodium, Trypanosoma and Ascaris (Structure and Life history only).
I/IV B.PHARMACY (1st SEMESTER)
101C 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 05. Dissection in Earthworm, (Digestive & Nervous systems)

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<th>TEXT BOOKS</th>
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</table>
Answer all the questions. All the Questions carry equal marks.

1. Describe the plant cell in detail with a neat diagram and give the main differences with animal cell.

(or)

Describe the difference between living organisms and non-living matter. Write a note on Mitosis and Meiosis in animals.

2. Describe the structure and reproduction of Bacteria and yeast.

(or)

Give the classification of plant kingdom add a note on xylem and Phloem.

3. Explain the taxonomical features of solonaceae family and its economic importance.

(or)

Explain the taxonomical features of umbelliferae family and its economic importance.

4. Give an account of morphological and anatomical characters of stem.
Write a note on different types of pollination methods.

Give the difference between monocot and dicot stem.

5. Describe the life history of Amoeba with figures.

(or)

Describe the life history and pathogenesis of plasmodium.

Write a note on life history of trypanosoma.

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**KRISHNA UNIVERSITY**

B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)

I/IV B.PHARMACY (1st SEMESTER)

102 PHARMACEUTICAL CHEMISTRY-I (ORGANIC-I)

(Theory) (75 Hrs)

**Unit : 01:**

**Structure and Properties :**

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.

**Chemistry of Hydrocarbons :**

a. Nomenclature and general methods to prepare alkanes, alkenes, alkynes and cycloalkanes.
b. Free radical chain reactions 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, polymerization 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 : 02
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 phosphorous 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 : 03
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 : 04
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 : 05
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, comparison with nucleophilic addition reaction, acidity of carboxylic acids, effect of substituents 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.

I/IV B.PHARMACY (1st SEMESTER)

103 PHARMACEUTICAL CHEMISTRY-I (ORGANIC-I)

(Practicals) (75 Hrs)

1. Determination of melting point.
2. Determination of boiling point.
3. Demonstration of various filtration techniques.
4. Demonstration of various crystallization techniques
5. Synthesis of benzoic acid by hydrolysis of Benzamide.
6. Synthesis of dibromo cinnamic acid from cinnamic acid.
7. Synthesis of dibenzal acetone from benaldehyde
8. 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 :

04. Study guide to accompany the T.B. of organic chemistry by Morrison and Boyd-Morrison and Boyd.5
I/IV B.PHARMACY (1st SEMESTER)  
102 PHARMACEUTICAL CHEMISTRY-I (ORGANIC-I)  
(Theory)  
Model Question Paper  
Time: 3Hours  Max. Marks 70M  
Answer all the questions. All the Questions carry equal marks.  

1) what are carbocations? classify carbocations with examples .explain relative of formation and stability of carbocations .  

or  

what are cycloalkanes ? write the methods of their preparations and reactions.  

2) Discuss the important methods to prepare monohydric alcohols .write the isomerism in alcohols.  

or  

Explain the orientation and reactivity involved in E1 and E2 reaction .write a note on hoffmanns and saytzeffs elimination.  

3a) Describe the mechanism ,stereochemistry and factors that effect SN1 reactions.  

b) Explain the rearrangements involved in SN1 mechanism.  

or  

a) Define nucleophilic substitution .write the types of nucleophilic aliphatic substitutions.  

b) write the differences between SN1 and SN2 reactions.  

4. Explain in brief the following:  
1) aldol condensation  
2) benzoin condensation  
3) cannizaro reaction  

or  

Give the nucleophilic addition reactions of aldehydes and ketones .  

5.  a) write a note on nucleophilic acyl substitution and differentiate nucleophilic acyl substitution from nucleophilic addition reaction.  

b) give the preparation and uses of malonic esters.
a) write any three methods to prepare carboxylic acids.

b) give the preparation and uses of acetoacetic ester.
Electromotive Forces and Oxidation-Reduction systems: Electrochemical cells, electro metric determination of pH and redox potentials.

Viscosity: poisseullis formula for liquids, experimental determination of viscosity, Ostwald viscometer, comparison of viscosities.
Surface tension: Introduction, Determination of Surface tension, Applications.

I/IV B.PHARMACY (1st SEMESTER)
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 sodium chloride 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 pKa of salicylic acid
12. Preparation of acetate buffer of pH 4

TEXT-BOOKS :

01. Physical Pharmacy by Alfred Martin.
02. Bentley’s Text book of Pharmaceutics by E.A.Rawlins.
03. Remington’s Pharmaceutical Sciences.
I/IV B.PHARMACY ( 1st SEMESTER)

MODEL QUESTION PAPER

104 PHYSICAL PHARMACY-I, (Theory)

Time: 3Hours Max. Marks 70M

Answer all the questions. All the Questions carry equal marks.

1. a) Explain the relationship between molecular structure & melting point of a compound.
   
b) Define & explain phase rule. Mention its significance in pharmacy.

   (Or)

   a) Discuss the relationship between intermolecular forces & states of matter.
   
b) Discuss the importance of polymorphism in pharmacy.

2. a) State & explain 1st law of thermodynamics.
   
b) Under different process conditions such as adiabatic & isothermal what happens to the 1st law.

   (Or)

   a) Explain 3rd law of thermodynamics.


3. Write about colligative properties? Explain the applications in pharmacy.

   (Or)

   a) Discuss the Arrhenius theory of electrolytic dissociation.

   b) Differentiate between ideal and real solutions. Define Raoult’s law & Mention their applications. What are its deviations?
4. a) What are buffers. How they are prepared? What are their pharmaceutical & Biological Applications?
   
   b) Discuss Handerson Hasselbach equation for a weak acid & its salt.

   (Or)

   a) Describe different methods of adjusting is isotonicity of solutions.

   b) Discuss the modern theories of acids & bases.

5. a) Discuss the importance of viscosity & add a note on measurement of viscosity by using Oswald’s viscometer.

   b) Write about electrochemical cell.

   (OR)

   a) Write about oxidation – reduction electrodes.

   b) Define surface tension. Explain various methods for the determination of surface tension & mention their applications.
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 Interpreter, Basic alphabet, constants, variables, operators, Expressions, hierarchy 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
TEXT BOOKS

1. Remington’s Pharmaceutical Sciences.
2. Basic Computer Programming by Er.V.K.Jain
3. Biostatistics by Alwin L.Lewis
5. Programming in “C” by E.Balaguru Swami.

KRISHNA UNIVERSITY
MACHILIPATNAM

B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 -13 ACADEMIC YEAR)
I/IV B.PHARMACY (2nd SEMESTER)
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., USP

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 sprits. Weighing - selection and care of weights and balances.

Packaging and Labelling of pharmaceuticals: Desirable features of containers, Types of containers and study of Glass and plastics as materials for containers and rubber as material for closures, their merits and demerits and labelling requirements.

Unit : 02

Dosage Forms – Introduction to dosage forms, classification with examples, liquid dosage forms essential characteristics

Formulation additives: Vehicles for liquids, Antioxidants, Preservatives, colouring agents, sweetening and flavouring agents.
Monophasic Liquid oral Dosage Forms: Definitions, General Formulations, Methods of preparation and uses of official products of the following: Solutions, Aromatic waters, Syrups, Elixirs, Dry Syrups, Mixtures.

Unit: 03
Monophasic Liquid Dosage Forms for external use: Definitions, General formulations, Methods of preparations, and uses of official products of the following: Lotions, Liniments, Throat Paints, gargles, Mouth washes, Glycerins, Collodions, Ear Drops, Nasal Drops, and Douches.

Galenicals: Study of extraction processes: Maceration, percolation and their modifications, continuous hot extraction, their applications.

Unit: 04
Biphasic Liquid Dosage Forms
Emulsions: Definitions, Types, Determination of Emulsion Types, Emulsifying Agents, Preparation, Stability of Emulsions.
Suspensions: Definitions, Types, Ideal Requirements, Formulation additives, Typical examples for oral and external use, Methods of preparation.

Unit: 05
Incompatibility: Physical, Chemical and therapeutic incompatibilities- Methods of overcoming and handling of incompatible prescriptions.
Suppositories: Ideal requirements, Different Bases, Preparation methods – calculations involving displacement value, Packaging and Supply.

I/IV B.PHARMACY (2 ND SEMESTER)
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

**LINIMENTS**
21. Camphor liniment (Camphorated oil)
22. Turpentine liniment

**GARGLES**
23. Phenol gargle BPC

**MOUTH WASHES**
24. Phenol and alkali mouth wash
25. Compound sodium chloride mouth wash

**THROAT PAINTS**
26. Compound iodine paint (Mandl’s throat paint)

**DOUCHES**
27. Solution of alum (Vaginal douche)
28. Potassium permanganate solution BPC

**EAR DROPS**
29. Hydrogen peroxide ear drops BPC
30. Sodium bicarbonate ear drops
31. Phenol ear drops

**NASAL DROPS**
32. Ephedrine hydrochloride nasal drops.

**GLYCERITES**
33. Phenol glycerin
34. Borax glycerin
35. Starch glycerin
36. Tannic acid glycerin

**SUSPENSIONS**
37. Magnesium carbonate suspension BPC
38. Magnesium trisilicate suspension BPC
39. Paediatric chalk mixture
40. Magnesium hydroxide suspension IP (Milk of magnesia)

**EMULSIONS**
41. Liquid paraffin emulsion
42. Calciferol emulsion
43. Castor oil emulsion

**SUPPOSiTORiES:**
44. Glycero-gelatin suppositories

**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.
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. Introduction to good laboratory practices. Importance of GLP in analysis of pharmaceuticals

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, pH and buffers. General principles and theory of acidimetry, alkalimetry, Oxidation, reduction methods, precipitation methods. An account of the indicators used in these titrations. Diazotisation titrations.

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. Determination of moisture content and alcohol content, theory and methods involved.
I/IV B. PHARMACY (2nd SEMESTER)
204 PHARMACEUTICAL ANALYSIS-I
(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

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 Analysys 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 Pharmacopeia
05. Quantitative Pharmaceutical Chemistry by Chatten.
07. Pharmaceutical analysis by P.C.Kamboj
08. Text Book of Pharmaceutical Analysis, Volume.1 by Dr.G.Devala Rao
Answer all the questions. All Questions carry equal marks.

1. Define and classify errors. Write a note on minimizations of errors.
   (OR)
   What is good laboratory Practice? Explain in detail. Write a note on importance of GLP in Pharmaceutical Analysis.

2. a) Write a note on sources of impurities in pharmacopoeial substances.
    b) Explain the principle and procedure involved in the limit test for iron and chlorides.
       (OR)
       a) Write a note of effects on impurities in pharmacopoeial substances on biological system.
       b) Explain the principle and procedure involved in the limit test for arsenic.

3. a) Explain in detail common ion effect and solubility product.
    b) Write a detailed note on pH and buffers. Add a focus on importance of buffers in pharmacy.
       (OR)
       a) Explain the general theory and principle of precipitation titrations.
       b) Write a note on selection of indicators in acid – base titrations .Give the significance of mixed indicators.

   (OR)
a) Write a detailed note on determination of moisture content in pharmaceuticals.

b) Write a note on determinations of alcohol content.

5 Explain different types of complexometric titrations in detail. Add a note on indicators used in this methods. Give the applications of complexometry.

(OR)

What are non-aqueous titrations? Explain in detail about different types of non-aqueous titrations. Write a note on solvents, titrants and indicators used in this method. Give the applications of non-aqueous titrations.

KRISHNA UNIVERSITY
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B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)
I/IV B.PHARMACY (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 : 4

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 : 5

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)

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
8. Environmental studies (for U.G.) - J.P.Sharma
Answer all the questions. All questions carry equal marks.

1. Give the classification of Ecosystems. Write in detail about the structure and characteristic features of grass land and desert ecosystem.

   (OR)

   Explain the importance of forest resources in the environment management. Enumerate the impact of over exploitation of ground water.

2. a) Give an account of biogeographical classification of India.

   b) Mention the threats to biodiversity and how do you conserve it.

   (OR)

   Write a note on value of biodiversity and conservation of biodiversity.

3. What are the different Sources for pollution and write in detail about the control of pollution caused due to water and air.

   (OR)

   Write a note on environmental problems in India. Add a note on rain water harvesting and watershed management.


   (OR)

   Write a detailed note on population growth and its effect on environment. Add a note on environmental movements in India.

b) Write a note on Chipko movement and Tehridam.
Unit : 01
Stereochemistry :
c. Stereochemistry of alicyclic compounds, biphenyls and oximes.

Unit : 02
Chemistry of Aromatic compounds :
 a. Aromaticity, structure of benzene, stability of benzene, general methods to prepare alyl 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 \( \text{a,b-unsaturated} \) 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.

**Reagents used in organic synthesis:** Preparation and applications of N- Bromo succinimide, Lead tetra acetate and Lithium Aluminium hydride.
II/IV B.PHARMACY (3rd SEMESTER)
302 PHARMACEUTICAL CHEMISTRY –II (ORGANIC-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:

II/IV B.PHARMACY (3rd SEMESTER)
301 PHARMACEUTICAL CHEMISTRY –II (ORGANIC-II)

(Theory)

Model Question Paper

1) a) write a brief note on sequence rules in determining the configuration of molecules.
   b) define racemic modification and methods for resolution of racemic mixture.

or

Explain the following
   1. optical activity
   2. enantiomerism
   3. diastereomerism
   4. elements of symmetry

2. a) explain the reactivity, orientation of electrophilic aromatic substitution in monosubstituted benzene.
   b) write a note on halogenation and friedal crafts alkylation.
write the methods of preparation and chemical reactions of phenols

3. a) explain synthetic methods and chemical reactions of phenanthrene
   b) give the structure and medicinal uses of propranolol and naphazoline
   or
   a) give the methods of synthesis and chemical reactions of naphthalene
   b) give the structure and medicinal uses of phenindione and morphine.

4. a) give the synthesis and reactions of pyridine
   b) give the structure and numbering of imidazole and acridine
   or
   Explain the following
   1. skraup synthesis
   2. diels alder reaction of furan
   3. oxidation reactions of pyrrole
   4. reduction reactions of thiophene.

5. write the note on the following
   1. mannich reaction
   2. lithium aluminium hydride
   or
   Explain briefly
   1. beckmann rearrangement
   2. N-Bromosuccinamide.
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 rotometer, 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

**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.Subrahmanymam,  
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.
Unit : 01

Unit : 02

Unit : 03

Unit : 04
Principles of immunology, methods of transmission of disease carriers, vectors and reservoirs, General methods of Immunization against diseases. Fundamentals of serology : Neutralization, Precipitation, Opsonization, agglutination, complement fixation tests and ELISA.

Unit : 05
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, typhoid, malaria and Amoebiasis, AIDS, infective Hepatitis.
01. General rules and procedure in microbiology lab
02. Introduction to equipment and ware used in microbiology lab
03. Preparation of culture medium for bacteria and fungi.
04. Aseptic transfer.
05. Simple staining
06. Gram staining
07. Bacterial motility
08. Acid-fast staining
09. Negative Staining
10. Oligo dynamic action of copper
11. Isolation of pure cultures by streak plate method.
12. Spore Staining
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
19. Nitrate reduction test
20. Hydrogen sulphide production test
21. Effect of salt concentration on the growth of micro Organisms
22. Effect of PH on growth of micro organisms
23. Indole production test
24. Citrate utilization test
25. Catalase production test

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
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

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

**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 respiration, 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.
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.
7. Determination of W.B.C. content of blood
8. Determination of bleeding time.
11. Determination of erythrocyte sedimentation rate of blood.
12. Recording of 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
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.
Unit : 01
Physicochemical properties of drugs in relation to biological action

**Sulphonamides:** Classification along with structures, mechanism of action, structure activity relation
ship(SAR) of sulphonamides and synthesis of sulphamethoxazole, trimethoprim, sulphacetamide, sulphapyridine, sulphasalazine, sulphamoxol, sulphafurazole, sulphaguanidine, sulphadoxine, sulphadimidine.

**Antifungal agents:** Definition, classification, ideal requirements of antifungals, structures, synthesis and uses of important antifungals and synthesis of hexylresorcinol, nitrofurazone, chlorobutanol methylparaben.

Unit : 02
**Antibiotics:** Classification of antibiotics based on spectrum, nature, chemical and mechanism of action.

**Penicillins:** Nomenclature, classification of penicillins based on source and spectrum of activity along with structures of different penicillins, degradation of penicillins, semi synthetic penicillins, the effect of stereochemistry in designing orally active penicillins, depot penicillin preparations, general method of synthesis of penicillins from 6-Amino penicillinic 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.

**Cephalosporins:** 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, cefotaxime, cefoperazone and cefaclor.

**Tetracyclines:** Structures of the important tetracyclines, important structural units, 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. A mention of other aminoglycoside antibiotics and their importance. 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 : 03**

**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, pyrantel pamoate, albendazole, piperazine citrate and niridazole.

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

**Unit : 04**

**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, iconozole, econozole, griseofulvin and flucytosine.

**Anti-Tubercular Drugs**: Introduction, classification, structure activity relationship (SAR), mechanism of action, structures of important 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 : 05**

**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 transcriptase inhibitors (zidovudine, lamivudine, stavudine, zalcitabine), nucleoside antimetabolites (ribavirin), nonnucleoside reverse transcriptase inhibitors (nevirapine). A brief note on HIV protease inhibitors. Synthesis of amantadine and idoxuridine.

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

**TEXT BOOKS**:  
4. Lippincott Williams and Wilkins: Remington Pharmaceutical Sciences
1. Write the physicochemical properties of drugs in relation to biological activity. Explain with suitable examples

   OR

   Classify sulfonamides with examples, discuss the SAR and mention their mode of action. Write the synthesis of sulphamethaxazole, sulphadimidine.

2. a. Write the chemical classification of antibiotics. Give an account of

   The chemistry and stability of pencillin molecule

   b. Write a brief account of fluoroquinolone antibacterials.

   OR

   a. Write the mechanism of action, SAR and therapeutic uses of tetracyclines

   b. Write the classification, SAR, metabolism of Macrolides antibiotics

3. What are antimalarials? Classify them with examples and discuss the SAR. Write the synthesis of Chloroquine and primaquine.

   OR

   a. Write the classification, mode of action of anthelmintics and synthesis of mebendazole, piperazine citrate.

   b. Write a brief account on antiamoebics.


   OR

   Write the classification, SAR, MOA of antitubercular agents. Synthesis of INH, ethambutol.

5. a. What are antineoplastic agents? Classify them with examples.

   Discuss the mode of action of alkylating agents.
b. Write short notes on plant products used in cancer chemotherapy.

OR

a. write the classification with chemical structures, MOA of antiviral drugs

b. A brief note on HIV protease inhibitors.

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B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)
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

Complexation : Types of Complexes, methods of analysis, complexation and drug action.
Unit : 02

Unit : 03

Unit : 04

Colloids & Coarse Dispersions: Types of colloidal systems, properties of colloidal Systems, solubilization.
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

**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.

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**B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)**

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.
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.

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B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)
II/IV B.PHARMACY (4th SEMESTER)
404 APPLIED BIO CHEMISTRY & CLINICAL PATHOLOGY (Theory) (75 hrs.)

Unit : 01
Definition, classification, some properties and reactions of carbohydrates, lipids and proteins. Diseases related to their metabolism.
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 : 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 cholesterol.

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 amino acids, glycine, phenylalanine, tyrosine, cystein, cystine, methionine, tryptophan, valine 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
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 SGOP.
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.

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B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)
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.
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.
09 Text book of Applied Biochemistry and Clinical pathology by Dr.G.Devala Rao
Unit : 01

Unit : 02
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 : 03
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 up-to-date

Unit : 04
Legislations to control the operations regulating to dangerous drugs, poisons and opium.
   a) Poisons Act and Rules

Unit : 05
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

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
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B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)  
II/IV B.PHARMACY (4th SEMESTER)  
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

KRISHNA UNIVERSITY
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B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)
III/IV B.PHARMACY (5th SEMESTER)
501 PHARMACEUTICAL CHEMISTRY –IV (MEDICINAL -II)
(Theory) (75 hrs.)

Unit 01

Drugs acting on CNS:

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

**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** – Classification, mechanism of action, SAR of barbiturates, synthesis, metabolism and therapeutic uses of phenobarbital, amylobarbital, pentobarbital, cyclobarbitone, calcium, thiopental, hexobarbital, chlordiazepoxide, diazepam, alprazolam.

**Anti-psychotics** – Classification, mechanism of action, SAR of phenothiazines, synthesis and therapeutic uses of promethazine, Prochlorperazine, Fluphenazine, chlorpromazine, haloperidol, clozapine, oxypentene.

**Anti-depressants**: Classification, mechanism of action, synthesis and therapeutic uses of amitryptaline, doxepine, iproniazid, isocarboxizide, trazodone, fluoxetin

**Anti – Anxietyagents** : Synthesis and therapeutic uses of nitrazepam, lorazepam, razepam.

**Anti-epileptics** – Types of seizures, classification, mechanism of action, synthesis and therapeutic uses of phenytoin, valproic acid, carbamazepine, ethosuximide.

Unit : 02
**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, dicyclamide, tropicamide, atropine, bipyridine.

**Unit : 03**

**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, dicoumarol, warfarin.

**Hypoglycaemics**: chemical classification, S.A.R of hypoglycemics, Insulin preparations, a brief account on statin antidiabetics, PPARg inhibitors, $\alpha$-glucosidase inhibitors, thyroid and antithyroid drugs.

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

**Unit :04**

**Opioid 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.


**Unit :05**

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

**Antihistaminic agents**: Chemical classification along with structures, mechanism of action, S.A.R, of antihistamines. Synthesis 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, diatrizoic acid and metyrapone

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**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 benzilic 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.
18 Identification of Drugs: Quinine sulphate, calcium gluconate, amoxicillin trihydrate, chloramphenicol, sulphadiazine.

**TEXT BOOKS**

1. Classify sedatives and hypnotics with suitable examples. Write the SAR and mode of action of barbiturates

OR

Write the classification, SAR of antipsychotics. Synthesis and therapeutic uses of haloperidol, promethazine

2 a). Outline the chemical classification of adrenergic drugs. Discuss their mode of action and SAR.

b). Write a note on adrenergic blockers

OR

a). Write in detail cholinergic and anti cholinergic drugs

b). Synthesis of methacholine, atropine

3. Write the classification of antihypertensive agents with structures, MOA and synthesis of propanolol, methyldopa

OR

a). What are oral hypoglycemic agents, classify them with examples and their mode of action

b). Write in detail insulin preparation

4. a). Write in detail SAR of morphine
b. Write about central and peripheral acting antitussive agents

OR

. Classify the NSAIDs with examples and discuss their mode of action. How do you synthesize diclofenac and piroxicom

5. Add a note on different drug design approaches. Give a detail account of computer aided drug design.

OR

Write a classification, SAR of H1 antagonists. Synthesis of pheniramine, cimetidine

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**B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)**

**III/IV 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.

**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.

**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.

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**III/IV B.PHARMACY (5th SEMESTER)**

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
17. Manufacture of NaNO3 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 Industrial Pharmacy by Lachman
02. Bentley’s Text Book of Pharmaceutics
03. Remington’s Pharmaceutical Sciences
04. Pharmaceutical Dosage Forms – Tablets by H.A.Lieberman
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.

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B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)
III/IV B.PHARMACY (5th SEMESTER)
505 PHARMACOGNOSY–I,(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.

Unit : 03
a) Plant growth regulators and their application. Polyploidy, mutation and hybridization with reference to medicinal plants.
b) Quality control of crude drugs: Adulteration of crude drugs, types of adulterants and their detection by organoleptic, microscopic, physical, chemical and biological methods of evaluation.

Unit: 04

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

Carbohydrates and derived products: Agar, guar gum, gum acacia, honey, isabgol, pectin, starch, sterculia and tragacanth

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

Proteins and enzymes: Gelatin, papain, yeast.

Tannins: Arjuna, black catechu, gambier catechu.

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

Unit: 05

a) Biogenesis of natural products: 1. A brief introduction to biosynthesis, 2. Production of primary and secondary metabolites of pharmaceutical importance from carbon metabolism in plants 3. Production of aminoacids by shikimic acid pathway 4. Biogenesis of atropine, Morphine, Isoprenoid compounds and cardiac glycosides

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

Reference Books


6 Cultivation of Medicinal and Aromatic crops by A A Farooqui and B.S.Sreeramu

7 Pharmacognosy and phytochemistry by Ashutoshkar.

8 Essentials of Pharmacognosy by Dr. S.H. Ansari.


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

02. Cellular Structures in powdered crude drugs :
   i. Measurement of length and width of phloem fibres in powdered crude drugs
   ii. Measurement of starch grains in powdered crude drugs
   iii. Measurement of calcium oxalate crystals in powdered crude drugs

03. Determination of Leaf constants
   i. Determination of vein islet number and vein let termination number of leaf crude drug
   ii. Determination of stomatal number and stomatal index of leaf crude drug
   iii. Determination of Palisade ratio of leaf crude drug

05 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.)

06. Determination of extractive value of vegetable crude drug.

07. Determination of swelling factor of Isabgol seeds
08. Estimation of percentage of eucalyptus oil (demonstration experiment)

III/IV. B.PHARMACY (5th Semester)
Model Paper  505  PHARMACOGNOSY-I (Theory)

Time: 3hrs. Max. Marks: 70

Answer all the questions. All questions carry equal marks.

1. Define Pharmacognosy. List out natural sources of drugs with examples. Distinguish between organized and unorganized drugs

   OR

   Describe different methods of classification of crude drugs with examples and explain their advantages and disadvantages

2. Explain the various factors influencing cultivation of medicinal plants

   OR

   Describe about types of soils, fertilizers of common use and natural pest control agents

3. Explain the role of various Plant growth regulators and their applications

   OR

   What are the types of adulteration of crude drugs, describe their detection by organoleptic, microscopic, physical, chemical and biological methods of evaluation.
4. Write notes on
   a) method of preparation and uses of papain
   b) method of preparation & uses of cod liver oil
   c) Rice bran oil
d) Cocoa butter

   OR

   Describe the, varieties, adulterants, substituents, principle
   constituents and uses of
   a) Agar
   b) Cannabis
   c) Sterculia
d) Turmeric

5. Write notes on
   a) Production of aminoacids by shikimic acid pathway
   b) Biogenesis of atropine

   OR

   Classify fibres used pharmaceutically. Describe the pharmacognosy of cotton. Add a note
   on absorbant cotton.

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B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)
III/IV B.PHARMACY (5th SEMESTER)
507 PHARMACOLOGY–I (Theory) (75 hrs.)

Unit : 01


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. Pharmacology of local anaesthetics

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, anti-emetics 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.
Unit : 01


Unit : 02


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

Crystallization : 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 vacuum crystallizers.
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. Podbielniak extractor

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
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.

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B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)
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, neutralization 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

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.

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

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**III/IV B.PHARMACY (6th SEMESTER)**

**604 PHARMACEUTICAL BIOTECHNOLOGY**

(Practicals) (75 hrs.)

01. Sterility test by direct inoculation method
02. Sterility test by membrane filtration method
03. Study of growth of stationary and rotary shake flask cultures
04. Microbial assay of antibiotics by disc plate method
05. Microbial assay of antibiotics by cup plate method
06. Microbial assay of antibiotics by turbidimetric method
07. Preparation of killed bacterial vaccine
08. Immobilization of enzymes
09. Screening and isolation of microorganisms from soil sample.
10. Production of lactic acid
11. Determination of MIC
12. Determination of additive and synergistic effect
13. Bioautography Technique
14. Production and estimation of alcohol
15. Determination of fungal diastase activity
16. Isolation of DNA from onions
17. Microbiological assay of Vitamin B₁₂
18. Gel Electrophoresis

**TEXT BOOKS :**

01. Industrial microbiology by Casida.
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**

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

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**B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)**

**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 BOOKS:**
01. Cooper and Gun—Dispensing for Pharmaceutical Students.
02. Hospital Pharmacy by William.E.Hassan.
03. Clinical Pharmacy by Tipnis Bajaj.
04. Pharmacotherapeutics by Roger and Walker.
Unit : 01

Biopharmaceutics :

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

Unit : 02


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.

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

Unit : 04

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 : 05
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

IV/IV B.PHARMACY (7th Semester)
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. Relationship 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 KE & 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
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.

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B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)
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-B12 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


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 b-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 Pharmacology by Rang and Dale.
03. Quaintessence of Medical Pharmacology by C.Chowdary.
05. Basic and clinical pharmacology by Bertran G.Katzung.
08. Essential of Pharmacotherepeutics by F.S.K.Barar.
General treatment of the theory, instrumentation and applications of the following analytical methods.

**Unit : 01**
Spectrophotometry (UV, Visible, IR), Nephelometry 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.
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 riboflavin 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

II. **U.V. Spectrophotometry**
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

**TEXT BOOKS:**
01. Quantitative Pharmaceutical Chemistry by Jenkins
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
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–Deterrent 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

Unit 01

Carbohydrates: Classification and general properties. Knowledge of structure including stereochemistry of glucose, fructose, and sucrose.
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 amyg dalin and salicin

Unit 02


Unit 03

Terpenes: Occurrence, general methods of isolation and classification, chemistry of citral, limonene, α-terpeneiol, carvone, camphor and menthol
Preparation, general composition, properties and analysis of essential oils of I.P.
Vitamins: Classification, chemistry, physiological role and uses of thiamine, riboflavin and ascorbic acid. Skeletal structures of vitamins official in I.P.

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

IV/IV B.PHARMACY (8th Semester)
801 PHARMACEUTICALCHEMISTRY-V (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. Determination of citral in lemon grass oil.
04. Chemical reactions of carbohydrates, alkaloids, glycosides, steroids, flavonoids
05. Isolation of casein from the milk
06. Isolation of piperine from black pepper powder
07. Extraction of caffeine from tea dust.
08. Estimation of quinine sulphate
09. Determination of Caffeine citrate

TEXT BOOKS:
01. Organic Chemistry - Vol. II by I.L.Finar
02. Organic, Pharmaceutical and Medicinal Chemistry by Wilson and Gisvold.
03. Remington’s Text Book of Pharm. Sciences.
04. Text book of Medicinal Chemistry by A.Burger
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
1. a. Discuss the Important Reactions and Structural features of Glucose
   
b. Write a brief account on chemistry of Cardiac glycosides

 OR

 a. Write the preparation and properties of Methyl glycosides
 b. Write the Structural elucidation of amygdalin and salicin

2. a. Write in detail the properties of Uric acid
   
b. Write the chemistry of protein hormone oxytocin

 OR

 Write in detail Amino-end degradation and carboxyl end degradation methods in proteins

3. a. Write the Analysis of fixed oils, fats and waxes
   
b. Write the chemistry of citral, α-terpenol

 OR

 Write the classification of vitamins and structural elucidation of Riboflavin

4. Write the classification and general methods determination of chemical structure of Alkaloids.

 OR

 What are alkaloids? How are they isolated and identified. Discuss the structural determination of papaverine.

5. a). Discuss the chemical relationship between oestrone, oestradiol and oestriol.

 b). Describe the synthesis of progesterone
a). Write the irradiation of ergosterol

b). Write the chemistry involved in bile acids and cortisone

KRISHNA UNIVERSITY
MACHILIPATNAM

B.PHARMACY SYLLABUS (WITH EFFECT FROM 2012 - 13 ACADEMIC YEAR)
IV/IV B.PHARMACY (8th Semester)
803 PHARMACOGNOSY-II (Theory) (75hrs.)

Unit : 01

Volatile oils: Definition, classification, general methods of extraction, identification tests and pharmacognostic study of the following crude drugs: Fennel, Clove, Coriander, Cardamom, Dill, Caraway, Eucalyptus, Bitter orange peel, Lemonpeel, Cinnamon, Cassia, Citronella, Civet, Gaultheria, Musk, Nutmeg, Palmarosa, Peppermint, Saffron, Sandal wood, Tulsi, Vetiver.

Unit : 02

Alkaloids: Definition, classification, general methods of extraction, identification tests and pharmacognostic study of the following crude drugs: Aconite, Belladona, Cinchona, Colchicum, Datura, Duboisia, Ephedra, Ergot, Hyoscyamus, Ipecac, Kurchi, Lobelia, Nux-vomica, Opium, Rauwolfia, Vasaka, Vinca, Withania.

Unit : 03

Glycosides: Definition, classification, general methods of extraction, identification tests and pharmacognostic study of the following crude drugs: Aloes, Ammi, Brahmi, Buckwheat, Cantharides, Cascara, Chirata, Digitalis, Dioscorea, Gentian, Ginseng, Kalmegh, Liquorice, Psoralea, Quassia, Senna, Rhubarb, Squill, Strophanthus, Wild Cherry bark.

Unit : 04

Historical development of plant tissue culture; types of cultures - 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, ( Biological source, chemical constituents, pharmacological actions and uses )

01. Amla (Phyllanthus emblica) 02. Bheda (Terminalia beieraica)
03. Kantkari (Solanum xanthocarpum) 04. Malkagni (Celastrus panicul
05. Tylophora( Tylophora indica) 06. Shatavari ( Asparagus racemosus)
07. Bhilawa( Semecarpus anacardium) 08. Kalijiri(Vernonia anthelmintica)
09. Kaner( Nerium indicum) 10. Punarnava ( Bocrhaevia diffusa)
11. Sankhapushpi

Reference Books :

5. O. P. Aggarwal, Chemistry of organic Natural Products Vol. I & II
6. G. Chatwal, Chemistry of organic Natural Products Vol. I & II
10. Paul m Dewick, “Medicinal Natural Products”, John Wiley & Sons, NY
IV/IV. B.PHARMACY (8th Semester)

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

1. Study of Macroscopical and microscopical characters of the crude drugs:
   - Fennel, Clove, Coriander, Cardamom, Dill, Nuxvomica, Cinnamon, Cinchona,
   - Quassia, Ephedra, Ipecac, Vasaka, Vinca, Datura, Senna.

2. Identification of powdered crude drugs based on their microscopical characters:
   - Senna, Vasaka, Ginger, Cinchona, Cinnamon, Squill, Rauwolfia,
   - Kurchi, Nuxvomica, Quassia

3. Exercises on Identification of powdered crude drug mixtures (2 and 3 powder mixtures), from crude drugs listed in 2 above, based on microscopical characters.

4. Study of Morphology of crude drugs:
   - Fennel, Clove, Coriander, Nuxvomica, Cinnamon, Cinchona, Dill, Ephedra, Senna, Vinca, Tulsi, Nutmeg, Peppermint oil, Lemon peel,
   - Aconite, Aswagandha, Kurchi, Rauwolfia, Dioscorea, Arjuna, Chirata, Squill,
   - Gentian, Ginger, Turmeric, Glycerrhiza, Amla, Ipecac, Bitter Orange Peel
1 Define Volatile oils, explain their general methods of extraction with diagrams and the advantages and disadvantages of individual methods.

OR

Describe the Pharmacognosy of Fennel with neat labelled diagrams

2. a) Classify Alkaloids chemically with examples, describe the general and specific chemical tests for alkaloids.

b) Describe the pharmacognosy of Rauwolfia.

OR

Describe Vinca under a suitable pharmacognostic scheme

3. Define glycoside. What are different types of steroidal Glycosides, How will you differentiate between them.

OR

Describe in detail the pharmacognostic study of Aloes

4 Describe the applications of plant tissue culture in production of pharmaceutically important secondary metabolites.

OR

Write notes on: a) Historical development of plant tissue culture
b) Callus culture and cell suspension culture

c) White’s and Murashige and Skoog’s culture media

5. Describe the biological source, chemical constituents and uses of

   a) Amla  b) Malkangni  c) Bhilawa  d) Punarnava

OR

Describe the biological source, chemical constituents and uses of

   a) Kantkari  b) Sankhpushpi  c) Shatavari  d) Punarnava
Unit : 01
Concepts and Philosophy of Good Manufacturing Practice (GMP). Brief introduction of CGMP.

Concepts and Philosophy of Validation. Validation methods of equipment.

Unit : 02
Validation methods of water supply systems, deionised and distilled water and water for injection.

Unit : 03
Calibration of Analytical Instruments (A brief introduction). Calibration of Spectrophotometer and HPLC instrument as per ICH guidelines.

Unit : 04
Sampling Techniques, Computer applications in GMP and GLP, Statistical quality control and control charts.

Unit : 05
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)

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