	P.R.GOVERNMENT COLLEGE(A), KAKINADA	Program & Semester			
Course Code PHCH:09	TITLE OF THE COURSE BASIC QC & QA COURSE:IX	II B. Sc., Pharmaceutical chemistry SEM-IV			
Teaching	Hours Allocated: (Theory)	L	T	P	C
Pre-requisites	fundamental knowledge on different conventional dosage forms.	40	10	30	3+1

Course Objectives:

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

1. Understand the cGMP aspects in a pharmaceutical industry.
2. Appreciate the importance of documentation
3. Understand the responsibilities of QA & QC departments

Course Outcomes:

On Completion of the course, the students will be able to	
CO1	Understand about various types of precautions to be taken during sample Preparation
CO2	Learn about the process of production in pharmaceutical industry
CO3	Correlate GLP with GMP in the documentation process
CO4	Learn about the practice of documentation in pharmaceutical industry

SYLLABUS

UNIT –I

Basics of sample preparation, preservation & storage:

Sampling process-purpose of sampling classes and types of pharmaceutical products- sampling facilities- sampling process-sampling procedure-sampling operation and precautions-Toxicity and carcinogenicity in handling critical samples- Standards and guidelines for sample handling- sample handling and stability- Good storage practices.

UNIT –II

Overview of Production Process for Life Sciences Industry

Fundamental science of API Production API Definition-Role of APIs – Top API Manufacturers
Need for conversion of drugs into formulations-Principles of Manufacturing operations.

UNIT–III

Validation in Pharmaceuticals

What is validation- Definition- difference between calibration- validation – Types of validation-
Raw material validation & process validation - Change Control Management-Define change
request

UNIT –IV

Documentation practices

Documents practices required by cGMP-Different types of documents,SOPs and records-
Document preparation, document/record issuance and retrieval-Good Document practices-
Documentation in line with GLP and GMP, Batch release documents

UNIT –V

Quality Control Laboratory:

Responsibilities, good laboratory practices, routine controls, instruments, protocols, non-clinical
testing, controls on animal house, data generation and storage, quality control documents, retention
samples, records, audits of quality control facilities - Finished products release: quality review,
quality audits, and batch release document.

TEXT BOOKS

1. The International Pharmacopoeia Vol. 1,2,3,4, 3rd edition General methods of analysis
quality specifications for Pharmaceutical substances, Excipients, dosage forms.
2. Quality Assurance of Pharmaceuticals: A compendium of guidelines and related material
Vol. 1 and Vol. 2., WHO, (1999).
3. GMP-Mehra.

REFERENCE BOOKS

1. Basic tests for Pharmaceutical substances - WHO (1988 & 1991)
2. How to practice GMP's – P.P.Sharma
3. The Drugs and Cosmetic Act 1940- Vijay Malik.
4. Q.A Manual by D.H.Shah.
5. SOP Guidelines by D.H.Shah.

CO-PO Mapping:**(1:Slight[Low]; 2:Moderate [Medium]; 3:Substantial [High], '-':No Correlation)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	3	2	3	3	3	1	2	2	3	2	3	3
CO2	3	2	3	3	2	3	3	1	3	3	2	3	2
CO3	3	3	3	3	2	2	2	2	2	3	3	3	2
CO4	3	2	2	2	2	2	3	3	1	1	3	3	3
Avg.	2.75	2.5	2.5	2.75	2.25	2.5	2.25	2	2	2.5	2.5	3	2.5

PO1 : Knowledge in Pharmaceutical Chemistry : Apply the knowledge of different dosage forms and their routes of administration.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze simple to complex problems reaching substantiated conclusions using fundamental principles of pharmaceutical chemistry.

PO3: Design/development of solutions: Design solutions for simple to complex problems and designing novel routes for the synthesis of bioactive / active pharmaceutical ingredients.

PO4: Conduct investigations on new drug discoveries: Use fundamental research-based knowledge and available research methodologies including design of experiments, analysis and interpretation of data, and synthesis of the drug molecules.

PO5 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for drug modeling and interpretation of simple to complex drug molecules.

PO6 : Society: Applying the contextual knowledge to assess societal, health, safety, legal issues.

PO7: Environment and sustainability: Understand the importance of synthetic drug chemistry for various discoveries in the field of health science and demonstrate the knowledge for sustainable development.

PO8 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmaceutical manufacturing practice.

PO9 : Communication: Communicate effectively on issues related to pharmaceutical chemistry with the medical community, being able to write the effective reports and documentations and presentations.

PO10: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change new drug investigations for new diseases.

PSO-1: To have a firm foundation in the fundamentals/concepts/theories and its applications in pharmaceutical chemistry.

PSO-2: To understand the structure and properties of drugs, Characteristics mechanisms of chemical reactions and their usage in pharmaceutical chemistry

PSO-3: To acquaint with safety measures that are to be taken in pharmaceutical chemistry laboratory and develop skills in proper manufacturing methods of pharmaceuticals and usage of different apparatus/instruments and carry out experimental procedures, record the observations and results and present the inference/conclusion

WEIGHTAGETOCCONTENT

SL.NO	COURSE CONTENT	ESSAY(10 M)	SHORT (5 M)	TOTAL MARKS	QUESTION REK
1	UNIT-I	1	2	20	Remembering, understanding
2	UNIT-II	2	1	25	Analyzing, Remembering
3	UNIT-III	1	2	20	Analyzing, Remembering
4	UNIT-IV	1	1	15	Analyzing, Evaluating
5	UNIT-V	1	1	15	Evaluating
	Total	6	7	95	

MODEL QUESTION PAPER

Time 2hrs

Max.Marks-50

Answer any THREE questions choosing at least ONE question from each section 3x10=30M

SECTION-A

1. One question is to be set from unit-I
2. One question is to be set from unit-II
3. One question is to be set from unit-II

SECTION-B

4. One question is to be set from unit-III
5. One question is to be set from unit-IV
6. One question is to be set from unit-V

Answer any FOUR questions

4x5=20M

7. One question is to be set from unit-I
8. One question is to be set from unit-I
9. One question is to be set from unit-II
10. One question is to be set from unit-III
11. One question is to be set from unit-III
12. One question is to be set from unit-IV
13. One question is to be set from unit-V

QUESTION BANK ESSAY QUESTIONS

UNIT-I

1. What are the various sampling process involved in pharmaceutical Industry
2. Describe the sampling procedure for raw materials in pharmaceutical industry
3. Describe the sampling procedure for powdered starting materials
4. Describe the sampling procedure for packaging materials

UNIT-II

1. What is the need for conversion of drug into formulation.
2. What are the various principles of manufacturing

UNIT-III

1. Write short note on process validation.
2. Write about equipment validation.
3. Explain about concurrent validation.
4. Define validation, write its importance and its types

UNIT IV

1. Write about good documentation practices.
2. Explain the guidelines for document preparation.

UNIT-V

1. Write about finished product release
2. Explain about animal house
3. Describe about non-clinical testing

SHORT ANSWERS

UNIT-I

1. What is stability and importance of stability studies
2. Differentiate toxicogenicity & carcinogenicity
3. Describe the five steps in sampling procedure
4. Describe the steps to weigh the sample

UNIT-II

1. Define API
2. Write a detail note on format and content of product regulatory documents
3. Enlist the various types of SOPs and discuss them briefly
4. Write a short notes on MSDS preparation
5. Give a short notes on (a) Batch record documentation (b) Log Books

UNIT-III

1. Define calibration, validation and qualification
2. Write about equipment validation.
3. Explain about concurrent validation
4. Explain the change control procedure in pharmaceutical industry

UNIT IV

1. What are the various types of documents .
2. Write a short note on SOP
3. Explain the guidelines for document preparation.
4. Write a short notes on Certificate of Analysis

UNIT V

1. Write about the responsibilities of personnel
2. Explain about quality audits
3. Write about data generation and storage
4. What are routine controls

PRACTICALS:

Determination of solubility of a range of substances in water Determination of LOD of the sample


Determination of melting point of the sample Determination of residue on ignition of the sample

To study the effect of Ph on solubility of drugs and raw materials

Study of some of the following drugs as per official monographs (ascorbic acid, acetaminophen , aspirin)

SCHEME OF VALUATION

Component	Marks Allotted
Writing the Principle & Procedure	10 Marks
Preparation of Solutions	5 Marks
Calculation	10 Marks
Accuracy of Result	15 Marks
Record Submission	5 Marks
Viva Voce	5 Marks
Total	50 Marks

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester II B. Sc., Pharmaceutical chemistry			
Course Code PHCH:10	TITLE OF THE COURSE: PHARMACOLOGY COURSE:X				
Teaching	Hours Allocated: (Theory)	L	T	P	C
Pre-requisites	fundamental knowledge on different drugs	40	10	30	3+1

Course Objectives

To make the student

- I. Understand the different types of drugs
- II. Understand the Pharmacology of different types of drugs.
- III. Understanding the Mechanism of action ,uses and ADR of different types of drugs.

On Completion of the course, the students will be able to	
CO1	Understand Clinical Pharmacology and Rational Drug Use
CO2	Develop Knowledge of Toxicology
CO3	Integrate Pharmacology with Therapeutics
CO4	Promote Lifelong Learning and Research

SYLLABUS

UNIT-I

General pharmacology -Introduction and scope of pharmacology, various routes of drug administration- advantages and disadvantages, Drug absorption- definition, types and factors affecting drug absorption, Bioavailability and factors affecting the bioavailability, Drug distribution- definition, factors affecting distribution , Biotransformation of drugs- definition , types of biotransformation ,Excretion of drugs- definition, routes of drug elimination, General mechanism of drug action and factors modifying the drug action.

UNIT-II

Drugs acting on blood forming organs: Anti-coagulants, Anti-platelets, Thrombolytics & hematinics.

Drugs acting on urinary system: Fluid and electrolyte balance, Diuretics & Antidiuretics.

UNIT-III

Drugs acting on cardiovascular system- definition, classification, pharmacological action, dose, indications and contraindications of Anti- Hypertensive drugs, Anti- Anginal drugs , Anti- Arrhythmic drugs.

Drugs used in atherosclerosis and congestive heart failure

UNIT- IV

Drugs acting on Gastro Intestinal Tract Definition, classification, pharmacological action, dose, indications and contraindications of Antacids, Antisecretory & Anti-ulcer Drugs, Laxatives & antidiarrhoeal drugs, Appetite Stimulants & Suppressants, Emetics & anti-emetics, Carminatives, Demulcents, Protectives, Adsorbents, Astringents, digestants, enzymes & mucolytics.

UNIT-V

Drugs acting on kidney Definition, classification, pharmacological actions, dose, indications and contraindications of Diuretics and Anti- Diuretics

Drugs Acting on the Respiratory System Anti-asthmatic drugs including bronchodilators, Anti-tussives & expectorants, Respiratory stimulants.

TEXT BOOKS

1. Sathoskar, Pharmacology and pharmaco therapeutics Vol. 1 & 2, Publ by Popular Prakashan, Mumbai.
2. Tripathi, Textbook of Pharmacology, JAYPEE.
3. H.P Rang, M. M. dale & J.M. Ritter, Pharmacology, Churchill living stone.
4. F.S.K. Barar, Text book of Pharmacology, S.Chand.
5. F.S.K Barar, Essentials of Pharamcotheraptics.

REFERENCES

1. J.G. Hardman and Lee E. Limbard, Good Mann & Gilmann: The Pharmacological Basis of Therapeutics, Mc Graw hill, Health Professions Dvn.
2. Bertram. G. Katzung, Basic and clinical pharmacology, 9th Edn, Mc Graw hill.

3. J. Crossland, Lewis 's Pharmacology, Church living stone.
4. Leilani Grajeda, Understanding Pharmacology: A Physiological Approach

CO-POMapping:

(1:Slight[Low]; 2:Moderate [Medium]; 3:Substantial [High], '-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	3	2	3	3	3	1	2	2	3	2	3	3
CO2	3	2	3	3	2	3	3	1	3	3	2	3	2
CO3	3	3	3	3	2	2	2	2	2	3	3	3	2
CO4	3	2	2	2	2	2	3	3	1	1	3	3	3
Avg.	2.75	2.5	2.5	2.75	2.25	2.5	2.25	2	2	2.5	2.5	3	2.5

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PO5 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for drug modeling and interpretation of simple to complex drug molecules. **PO6 :**

Society: Applying the contextual knowledge to assess societal, health, safety, legal issues.

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**PHARMACOLOGY
WEIGHTAGE TO CONTENT**

S No .	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	1	2	20	Remembering, understanding
2.	UNIT-II	2	1	25	Analyzing, Remembering
3.	UNIT-III	1	2	20	Analyzing, Remembering
4.	UNIT-IV	1	1	15	Analyzing, Evaluating
5.	UNIT-V	1	1	15	Evaluating
	Total	6	7	95	

PHARMACOLOGY
MODEL QUESTION PAPER

Time 2hrs

Max.Marks-50

Answer any THREE questions choosing at least ONE question from each section
3x10=30M

SECTION-A

1. One question is to be set from unit-I
2. One question is to be set from unit-II
3. One question is to be set from unit-II

OR

4. One question is to be set from unit-III
5. One question is to be set from unit-IV
6. One question is to be set from unit-V

SECTION-B

Answer any FOUR questions

4x5=20M

7. One question is to be set from unit-I
8. One question is to be set from unit-I
9. One question is to be set from unit-II
10. One question is to be set from unit-III
11. One question is to be set from unit-III
12. One question is to be set from unit-IV
13. One question is to be set from unit-V

PHARMACOLOGY

QUESTION BANK

ESSAY QUESTIONS

UNIT-I

1. Discuss the various routes of drug administration, highlighting their advantages and disadvantages.
2. Explain the process of drug absorption, the factors affecting it, and the concept of bioavailability.
3. Describe drug distribution, biotransformation, and excretion, including the factors that influence each process and their significance in pharmacology.

UNIT-II

1. Discuss the pharmacology of drugs acting on blood-forming organs, including anticoagulants, antiplatelets, thrombolytics, and hematinics.
2. Explain the classification, mechanism of action, and therapeutic uses of diuretics and antidiuretics.
3. Describe the role of drugs in maintaining fluid and electrolyte balance and their clinical significance.

UNIT-III

1. Discuss the pharmacology of antihypertensive drugs, including their classification, mechanisms of action, indications, contraindications, and examples.
2. Explain the pharmacological actions, therapeutic uses, and contraindications of anti-anginal and anti-arrhythmic drugs.
3. Describe the drugs used in the management of atherosclerosis and congestive heart failure, including their mechanisms of action and clinical significance.

UNIT-IV

1. Discuss the pharmacology of antacids, antisecretory, and anti-ulcer drugs, including their classification, mechanism of action, indications, contraindications, and examples.
2. Explain the pharmacological actions, therapeutic uses, and precautions of laxatives, antidiarrhoeal drugs, appetite stimulants, and suppressants.
3. Describe the pharmacology and clinical uses of emetics, anti-emetics, carminatives, demulcents, protectives, adsorbents, astringents, digestants, enzymes, and mucolytics.

UNIT-V

1. Discuss the pharmacology of diuretics and antidiuretics, including their classification, mechanism of action, indications, contraindications, and examples.
2. Explain the pharmacological actions, therapeutic uses, and precautions of anti-asthmatic drugs,

including bronchodilators.

3. Describe the pharmacology and clinical uses of anti-tussives, expectorants, and respiratory stimulants.

SHORT QUESTIONS

UNIT-I

1. Define pharmacology and discuss its scope.
2. List the factors that affect drug absorption.
3. What are the main types of biotransformation of drugs?
4. Name the routes of drug elimination and briefly

describe them. UNIT-II

1. Define anticoagulants and give two examples.
2. What are hematinics, and why are they important in clinical practice?
3. List the main types of diuretics with one example for each.
4. Define antidiuretics and mention a commonly used drug in this

category. UNIT-III

1. Define antihypertensive drugs and give two examples.
2. What are anti-anginal drugs? Mention one common drug from this class.
3. List the main classes of anti-arrhythmic drugs.
4. Name two drugs used in congestive heart failure and briefly state their

action. UNIT-IV

1. Define antacids and give two examples.
2. What are laxatives, and what is their primary therapeutic use?
3. Name two commonly used anti-emetics.
4. Define digestants and enzymes used in gastrointestinal

therapy. UNIT-V

1. Define diuretics and give two examples.
2. What are antidiuretics? Name one commonly used drug.
3. List two classes of bronchodilators used in asthma management.
4. Name one commonly used anti-tussive and one expectorant.

COURSE :X PHARMACOLOGY

PRACTICALS

Study of laboratory animals (a. mice b. rats c. guinea pigs d. rabbits)

Study of different routes of administration of drugs

Determination of analgesic effect using Analgesiometer

Study of local anesthetics on rabbit eye and study of Mydriatic and Mitotic effect on rabbit eye


Principles involved in screening of Muscle relaxants using Rota Rod apparatus

Study of effect of drugs on isolated heart

Effect of ciliary motion on frog buccal cavity

SCHEME OF VALUATION

Component	Marks Allotted
Writing the Principle & Procedure	10 Marks
Preparation of Solutions	5 Marks
Calculation	10 Marks
Accuracy of Result	15 Marks
Record Submission	5 Marks
Viva Voce	5 Marks
Total	50 Marks

	PITHAPUR RAJAH'S GOVERNMENT COLLEGE(A), KAKINADA DEPARTMENT OF CHEMISTRY		Program & Semester II B.Sc. PHARMA CHEMISTRY(H) (SEMESTER – IV)			
	Course Code PHCH11	TITLE OF THE COURSE Course -PC-11: SPECTROSCOPY				
Teaching	Hours Allocated: 45 (Theory) (3 hrs. / Wk.)		L	T	P	C
Pre-requisites:	Basic knowledge about spectrum and its classification		45	10	30	3+1

Course Objectives:

- To inculcate basic knowledge on basic concepts like Beer-Lambert's law
- To understand the concept of Spectroscopy
- To illustrate the classification of spectroscopies
- To provide knowledge and applications on various spectroscopies

Course Outcomes:

On Completion of the course, the students will be able to-		Cognitive Domain
CO1	Understand the basic governing law of spectroscopy – Beer lamberts law and interaction of electromagnetic radiation with matter	Knowledge
CO2	Learn Principles of Electronic, IR and NMR spectroscopies	Understand
CO3	Understand Applications of Electronic, IR and NMR spectroscopies	Application
CO4	Applying principles of various spectroscopies to various organic compounds	Application
Skill Development		Employability
		Entrepreneurship

Syllabus:

UNIT-I

GENERAL FEATURES OF ABSORPTION

- Beer-Lambert's law and its limitations, transmittance, Absorbance, and molar absorptivity.
- Single and double beam spectrophotometers. Application of Beer-Lambert law for quantitative analysis of 1. Chromium in $K_2Cr_2O_7$ 2. Manganese in Manganous sulphate

UNIT-II

ELECTRONIC SPECTROSCOPY:

Interaction of electromagnetic radiation with molecules and types of molecular spectra. Energy levels of molecular orbitals (σ , π , n). Selection rules for electronic spectra. Types of electronic transitions in molecules effect of conjugation. Concept of chromophore and auxochrome.

UNIT-III

INFRA RED SPECTROSCOPY:

Different Regions in Infrared radiations. Modes of vibrations in diatomic and polyatomic molecules. Characteristic absorption bands of various functional groups. Interpretation of spectra-Alkanes, Aromatic, Alcohols carbonyls, and amines with one example to each.

Functional group and finger print Region.

UNIT-IV

PROTON MAGNETIC RESONANCE SPECTROSCOPY (1H-NMR)

Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, NMR splitting of signals - spin-spin coupling, coupling constants.

UNIT-V

APPLICATIONS

Applications of NMR with suitable examples - ethyl bromide, ethanol, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate, toluene and acetophenone.

Applications of UV-Visible and IR-Spectroscopy

List of Reference Books:

- Spectroscopy by William Kemp
- Spectroscopy by Pavia
- Organic Spectroscopy by J. R. Dyer
- Elementary organic spectroscopy by Y.R. Sharma
- Spectroscopy by P.S. Kalsi
- Organic spectroscopy by Jagmohan

CLO-PLO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High], '-': No Correlation)

	CL O\P LO	PL O1	PL O2	PL O3	PL O4	PL O5	PL O6	PL O7	PL O8	PLO 9	PLO1 0	CLO \PLO	PLO1
CLO1	3	2	3	2	2	2	3	3	2	2	3	3	3
CLO2	2	3	3	3	3	2	1	2	2	3	2	2	3
CLO3	3	3	3	2	2	1	1	2	3	1	2	3	3
CLO4	2	1	2	1	3	2	3	1	2	3	2	3	2
CLO5	2.5	2.25	2.75	2.0	2.5	1.75	2.0	2.0	2.25	2.25	2.25	2.75	2.75

WEIGHTAGE TO CONTENT

S No	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	1	1	15	Remembering, understanding
2.	UNIT-II	1	2	20	Analyzing, Remembering
3.	UNIT-III	1	2	20	Analyzing, Remembering
4.	UNIT-IV	2	1	25	Analyzing, Evaluating
5.	UNIT-V	1	1	15	Evaluating
	Total	6	7	95	

**P.R. GOVERNMENT COLLEGE (A), KAKINADA
II B.Sc. PHARMA CHEMISTRY, SEMESTER-IV**

COURSE-PC-11: SPECTROSCOPY

MODEL QUESTION PAPER

TIME: 2 hrs.

MAX. MARKS: 50

SECTION-A

Answer any THREE questions choosing at least ONE question from each section Each carries 10 Marks

3x10=30M

1. One question is to be set from unit-I
2. One question is to be set from unit-II
3. One question is to be set from unit-III

SECTION-B

4. One question is to be set from unit-IV
5. One question is to be set from unit-IV
6. One question is to be set from unit-V

Answer any FOUR questions Each carries FIVE marks.

4x5=20M

7. One question is to be set from unit-I
8. One question is to be set from unit-II
9. One question is to be set from unit-II
10. One question is to be set from unit-III
11. One question is to be set from unit-III
12. One question is to be set from unit-IV
13. One question is to be set from unit-V

P.R. GOVERNMENT COLLEGE(A), KAKINADA
II B.Sc. PHARMA CHEMISTRY, SEMESTER-IV 2025-26
COURSE-PC-11: SPECTROSCOPY

QUESTION BANK

UNIT-I

GENERAL FEATURES OF ABSORPTION

1. What is Beer-Lambert's law. What are its limitations.
2. Describe Single beam and double beam spectrophotometer.
3. Explain the determination of Chromium in $K_2Cr_2O_7$ using spectrophotometer.
4. Explain the determination of Manganese in $MnSO_4$ using spectrophotometer.
5. Define the following terms.
 - a) Transmittance
 - b) Absorbance
 - c) Molar absorptivity
6. Write the working principle of Spectrophotometer.

UNIT-II

ELECTRONIC SPECTROSCOPY

7. Explain different types of electronic transitions occur in a molecule.
8. Write about Chromophore and Auxochrome with examples.
9. What is electromagnetic spectrum.
10. Write the selection rules for electronic spectra.
11. Explain the impact of conjugation on electronic transitions in a molecule.
12. Write about different types of molecular spectra.
13. Explain energy levels of molecular orbitals.

UNIT-III

INFRA RED SPECTROSCOPY

14. Explain the characteristic absorption bands of various functional groups in IR spectroscopy.
15. Write about the different regions of Infrared radiations.
16. What are the modes of vibrations in diatomic and poly atomic molecules.
17. What are the applications of IR spectroscopy.
18. Explain about Finger print region in IR spectrum.

UNIT-IV


NMR SPECTROSCOPY

19. Explain the Principle involved in NMR spectroscopy.
20. Explain the following
 - a) Equivalent and Non-Equivalent protons
 - b) Spin – Spin coupling
21. Write a note on Chemical shift.
22. Explain about the position of signals and splitting of signals in NMR spectroscopy.

UNIT-V

APPLICATIONS NMR SPECTROSCOPY

23. Explain the Applications of NMR spectra of
 - a) Ethyl bromide
 - b) Ethyl alcohol
 - c) Acetaldehyde
 - d) 1,1,2-Tribromoethane
 - e) Ethyl Acetate
 - f) Acetophenone.
24. Applications of UV-Visible and IR spectroscopy.

	PITHAPUR RAJAH'S GOVERNMENT COLLEGE(A), KAKINADA DEPARTMENT OF CHEMISTRY		Program & Semester II B.Sc. Pharmaceutical Chemistry (SEMESTER – IV)			
	Course Code PHCH11	TITLE OF THE COURSE Course -PC-11: SPECTROSCOPY				
Teaching	Hours Allocated: 30 (Practical)		L	T	P	C
Pre-requisites	Preparation of standard solutions and handling of laboratory apparatus and instruments		-	-	2	1

Course Objectives:

- To demonstrate basic knowledge about the handling of laboratory apparatus
- To illustrate knowledge about the preparation of standard solutions
- To provide hands-on training for the determination of different organic compounds

Course Outcomes:

On Completion of the course, the students will be able to	
CO1	Learn to Handle and calibrate the common laboratory glass apparatus and instruments
CO2	Get practical skill to the preparation of different standard solutions used for quantitative analysis
CO3	Identify and confirm the structure of a given organic compounds
CO4	Principles and applications of different molecular spectra

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	-
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IR spectral analysis of the following functional groups with examples

- Hydroxyl Groups
- Carbonyl Groups
- Amino Groups
- Aromatic Groups

CLO-PLO Mapping:

1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High], 4: (No Correlation)

	CL O\P LO	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO1 0	CLO\ PLO	PLO1
CLO1	3	3	3	2	3	2	2	2	3	2	2	3	3
CLO2	3	3	3	2	3	2	2	3	2	3	3	3	3
CLO3	3	2	3	2	3	1	2	2	2	2	2	3	2
CLO4	3	3	2	1	3	2	2	1	2	3	3	3	3
CLO5	3	2.75	2.75	2	3	2	2	2	2.25	2.5	2.5	3	2.75