

P.R.Government College (Autonomous)

Kakinada

(Affiliated to Adikavi Nannaya University)



Department of Chemistry

B.Voc(Pharmaceutical Chemistry)

Under NSQF Scheme

Board of studies

2022-23

PROCEEDINGS OF THE PRINCIPAL, P.R.GOVERNMENT COLLEGE(A), KAKINADA-A.P

Present: Dr. B. V. Tirupanyam, M.Sc; Ph.D.

R.C.No.12A/A.C./BOS/2022-23.Dated: 24.09.2022

SUB: P.R. Government College(A), Kakinada-UG Board of Studies (BOS)-
Program/Course- B.Voc Pharmaceutical Chemistry, Nomination of Members-
Orders issued.

REF: 1. UGC Guidelines of for Autonomous Colleges-2018.

ORDERS:

The Principal, P.R. Government College(A), Kakinada is pleased to constitute UG Boards of Studies in B.Voc Pharmaceutical chemistry for framing the syllabi in pharmaceutical chemistry Subject for all Semesters duly following the norms of the UGC Autonomous guidelines.

S.No	Name of the Nominee	Designation
1	Dr. D. Chenna Rao	Chairman& Lecturer Incharge.
2	Prof .K.Deepthi	University Nominee Assit. Professor & Head of the Department of Chemistry, AKNU, Rajamahendravaram.
3	Dr. K. Jhansi Lakshmi	Subject Expert & Lecturer in hemistry ASD G Govt Degree College For Women(A), Kakinada.
4	Sri .V. Mallikarjuna Sarma	Subject Expert & Lecturer inChemistry ASD G Govt Degree College For Women(A), Kakinada.
5	Dr.B.Ramesh Babu	Representative from Industry Founder & MD BogaR laboratories,Peddapuram.
6	V. Sanjeeva Kumar	Member
7	T.V.V.Satya Narayana	Member
8	P. Vijay Kumar	Member
9	V. Rambabu	Member
10	G. Pavani	Member
11	Dr. N. Bujji Babu	Member
12	Dr. Ch. Praveen	Member
13	V. Venkateswara Rao	Member
14	M.S.S.V.Uma Gayathri	Member
15	K. Kushma Sowjanya	Student Alumni Member
16	N. Sudha Rani	Student Member

The above members are requested to attend the BoS meeting on **03-11-2022** and share their valuable reviews, and suggestions on the following functionaries.

- Prepare syllabi for the subject keeping in view the objectives of the college, interest of the stake holders and National requirement for consideration and approval of the IQAC and Academic Council.
- Suggested methodologies for innovative teaching and evaluation techniques.
- Suggest the panel of Names to the academic council for appointment of Examiners.
- Coordinate research, teaching, extension and other activities in the Department of the college.


PRINCIPAL

P. R. Government College(A),
Kakinada

VISION AND MISSION OF THE COLLEGE:

Vision

To provide the right academic environment paving way for intellectual excellence, humane feelings and social commitment. The college believes in providing quality education for the socially disadvantaged, economically weaker sections of the society and thereby help them move up the ladder of success and social order.

Mission

- ➔ To impart holistic education with special emphasis on character, culture, updated knowledge and skill oriented learning.
- ➔ To make the students enjoy the fruits of globalization without prejudice to their local and cultural environment.
- ➔ To impart necessary life skills so as to make them face any challenge in the bigger world – Social, ethical, psychological or professional

P.R. GOVT.COLLEGE (A), KAKINADA

Department of Chemistry

B.Voc Pharmaceutical Chemistry

Minutes of board of studies (BOS) meeting 2022-23 conducted on 03-11- 2022

Meeting of Board of Studies in **B.Voc Pharmaceutical Chemistry** is convened on **03-11- 2022** through offline at P.R. Govt. College (A), Kakinada.

Venue: Conference Hall, Dt: **03-11- 2022**

The Principal: **Dr. B.V. Tirupanyam,**

Chairman : **Dr.D.Chenna Rao** Chairman and lecturer in charge.

University: **Prof .K.Deepthi,** Asst.Professor,

Nominee Adikavi NannayaUniversity Rajamahendravaram.

Industrialist : **Dr. B. Ramesh Babu,** Founder & M.D.,

BogaR laboratories, Peddapuram,

Subject . **Dr. K. Jhansi Lakshmi** Lecturer in Chemistry,

Expert 1 ASD Govt Degree College For Women(A), Kakinada.

Subject . **Sri .V. Mallikarjuna Sarma** Lecturer in Chemistry,

Expert 2 ASD Govt Degree College For Women(A), Kakinada.

All the facultymembers of Chemistry Department and student alumni attended the meeting.

AGENDA:

- To discuss the Semester System and Choice Based Credit System (CBCS) being implemented for the past 06 years, i.e., w.e.f. 2018-19.
- To discuss and approve the Continuation/Modifications of the syllabus for the Odd & Even Semesters of I, III & V Years for 2022-23.
- Grant of Extra credits for Online SWAYAM MOOCs etc.
- Syllabus, Model Question Papers and Model Blue Prints for I, II, III, IV, V and VI Semesters.
- Teaching learning methodology by 60:40 (External: Internal) ratio for the present II- and III-Year Students and 50:50 (External: Internal) ratio I Year Students w.e.f. 2022-23.
- Panel of paper setters and examiners.
- Proposals for Community Service Projects/Extension activities for the benefit of the society.
- To mke it mandate to posses 75% of attendance to allow the students for each mid Examination and Semester examinations.
- To mke it flexible the semester academic schedule in V & VI semesters keeping in view of availability of Embeded Industrial Aprenticeship.
- Department action plan for 2022-23.
- Any other items with the permission of the chair.

RESOLUTIONS:

The Meeting Of Board Of Studies In B.Voc Pharmaceutical Chemistry is convened on **03-11-2022** at LCD Hall-1 in P.R.Govt. College (A), Kakinada. The Principal Dr.B.V.Tirupanyam ,Dr. K. Deepthi, University Nominee, Subject Expert1 Dr. K. Jhansi

Lakshmi Lecturer in Chemistry, Subject2 Expert, Sri V.Mallikarjuna Sarma, GDC(W),Kakinada ,all members of the faculty of Chemistry and student representatives attended the meeting. Agenda items are discussed and the following resolutions were made.

1. It is resolved to follow the revised Choice Based Credit System for B. Voc Courses scrupulously as per the directions of Andhra Pradesh State Council of Higher Education(APSCHE), Vijayawada and also as per the directions of Adikavi Nannaya University, Rajamahendravaram with effect from the academic year 2022-23.
2. It is resolved to follow the revised curricular framework for B. Voc courses scrupulously as per the directions of Andhra Pradesh State Council of Higher Education (APSCHE), Vijayawada and also as per the directions of Adikavi Nannaya University, Rajamahendravaram with effect from the academic year 2022-23.
3. It is resolved to choose Life Skill courses and Skill Development Courses in concurrence with the vocational course.
4. It is resolved to conduct industrial visits for B. Voc students to make them acquainted with the industrial environment.
5. It is resolved to admit both Intermediate(MPC) stream and Intermediate(Bi.P.C) stream students into B.Voc courses and design the curriculum accordingly.
6. It is resolved to run B.Voc(Pharmaceutical Chemistry) in two streams namely
 - i. B.Voc Pharmaceutical Chemistry Maths stream and
 - ii. B.Voc Pharmaceutical Chemistry Biology stream.
7. It is resolved to organize Guest lectures by eminent professors and Industrial Experts.
8. It is resolved to implement a pass minimum for internal assessment for CBSE pattern students as the pattern is learner oriented.
9. It is resolved to submit proposals to conduct a faculty development programme in instrumentation techniques/advanced topics with the assistance of industry representatives and university representatives.

10. It is resolved to conduct Industrial Internship for a period of two months during the summer after completion of semester end examinations.
11. It is resolved to make it mandatory for the students in the entire V semester to undergo industrial internship for a period of 6 months in a Pharma Industry.
12. It is resolved together students of B.Voc (Pharmaceutical Chemistry) registered in NAPS (National Apprenticeship Promotion Scheme).
13. It is resolved that the B.Voc (Pharmaceutical Chemistry) course is restructured in B.Sc(Professional) (Pharmaceutical Chemistry). The proposal is put forward to Academic Council and General Body Meeting.
14. It is resolved to follow strictly the guidelines of UGC under NSQF scheme for the recruitment and engagement of faculty and non-teaching staff.
15. It is resolved to follow the same syllabi for English, Second Language, Life Skill Courses and Skill Development Courses as those prescribed for UG Courses by APSCHE, Vijayawada.
16. It is resolved to follow the same syllabi for main subjects namely Mathematics, Botany and Chemistry as it is , as they prescribed for UG Courses by APSCHE,Vijayawada, and as they are implementing in our College for other courses.
17. It is resolved to implement 50% external & 50% internal marks for theory & 100% external marks in practicals from the academic year 2020-21 for first second and third year students only.
18. It is resolved to implement 60% external & 40% internal marks for theory &100% external marks in practicals from the academic year 2020-2021 for third year students.
19. .It is resolved that the students should posses (maintain)75% attendance for both theory and practical in order to attend the mid and semester examination.
20. Resolved to reduce 40 marks of Theory internal to 20 marks for mid exams and 20 marks for co-curricular activities (Seminar / Assignment / Quiz / Group Discussion) and reduce 50 marks of theory internal to 25 marks for mid exams and 25 marks for co-curricular activities (Seminar / Assignment / Quiz / Group Discussion).
21. Resolve to conduct practical examinations semester wise with external examiners in even semesters only

22. .Resolved to conduct evaluation on project submitted Embedded Industrial apprenticeship in V/VI semester with internal examiners only.
23. Resolved to send the students to Embedded Industrial apprenticeship in semester V or in semester VI or even in middle of semester V/VI whenever opportunities available and that may be in continuation with Internship to be done at the end of 2 semester.
24. Resolved to follow the Action plan of Dept chemistry as the BVOC Pharmaceutical chemistry course is anchoring by Dept of chemistry.
25. Resolved to recommend the following faculty as paper setters.
 - i)Dr.D. S. V. N. N. Rama Murthy,GDC(A),Tuni
 - ii)K. Anand ,GDCPithapuram..,
 - iii) Sri V.Mallikarjuna Sarma, GDC(W),Kakinada
 - iv) Smt A.Sravani Ratnam, GDC,rajamahendravaram.

About B.Voc(Pharmaceutical Chemistry)

The University Grants Commission (UGC) had launched a scheme on 27 February, 2014 for skills development based higher education as part of college/university education, leading to Bachelor of Vocational (B.Voc.) degree with multiple entry and exit points. Considering the implementation modalities, the guidelines of the scheme have been revised in the year 2015. The B.Voc. Programme is focused on universities and colleges providing undergraduate studies which would also incorporate specific job roles and their NOS s along with broad based general education. This would enable the graduates completing B. Voc to make a meaningful participation in accelerating India's economy by gaining appropriate employment, becoming entrepreneurs and creating appropriate knowledge.

Objectives

1. To provide judicious mix of skills relating to a profession and appropriate content of general education.
2. To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.
3. To provide flexibility to students by means of pre-defined entry and multiple exit points.
4. To integrate NSQF with in the undergraduate level of higher education in order to enhance employability of the graduates and meet industry requirements. Such graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global work force.
5. To provide vertical mobility to students coming out of (a) 10+2 with vocational subjects; and (b) Community Colleges.

Course Objectives:

To make student

1. Understand the basic concepts of Organic Chemistry
2. Understand different types of organic reactions
3. Acquire knowledge on qualitative and quantitative chemical analysis
4. Develop skills in the usage and application of laboratory instruments
5. Understand the mechanisms of various organic reactions
6. Acquire knowledge on various types of Pharmacopoeia.
7. Understand various forms of medicines and the role of additives in formulations

8. Acquire knowledge on different types of instrumentation techniques in chemical analysis.
9. Understand stereochemistry of carbon compounds its importance in organic chemistry
10. Acquire knowledge on the basic concepts of computers
11. Develop skills in MSword, MSExcel and MSPowerPoint applications.
12. Develop communication and soft skills.
13. Visit pharmaceutical industries and understand the functioning of plant

CourseOutcomes:

At the end of the course, the student will be able to

1. Acquire competence and skills in various techniques in chemical analysis.
2. Ready to get a suitable position or job role such as Quality Control Chemist, Quality Assurance Chemist, Production Chemist in a Pharmaceutical Industry
3. Choose for an academic progression under vertical mobility for higher studies.
4. Eligible for various competitive examinations in various posts recruited by State and Central Governments.


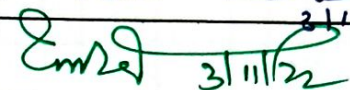


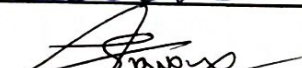
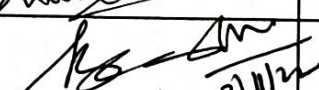
***Members who invited for the Board of studies meeting in Chemistry
to be held On 03rd November 2022***

Mode of Conduct of meeting: **Offline & online**

S.No	Name of the Nominee	Designation
1	Dr. D. Chenna Rao	Chairman& Lecturer Incharge.
2	Prof .K.Deepthi	University Nominee Assit. Professor & Head of the Department of Chemistry, AKNU, Rajamahendravaram.
3	Dr. K. Jhansi Lakshmi	Subject Expert & Lecturer in hemistry ASD G Govt Degree College For Women(A), Kakinada.
4	Sri .V. Mallikarjuna Sarma	Subject Expert & Lecturer inChemistry ASD G Govt Degree College For Women(A), Kakinada.
5	Dr.B.Ramesh Babu	Representative from Industry Founder & MD BogaR laboratories,Peddapuram.
6	V. Sanjeeva Kumar	Member
7	T.V.V.Satya Narayana	Member
8	P. Vijay Kumar	Member
9	V. Rambabu	Member
10	G. Pavani	Member
11	Dr. N. Bujji Babu	Member
12	Dr. Ch. Praveen	Member
13	V. Venkateswara Rao	Member
14	P.R. Ravi Varma	Member
15	K. Kushma Sowjanya	Student Alumni Member
16	N. Sudha Rani	Student Member

**Signatures of the members who attended the Board of studies in Chemistry
On 03rd November 2022**

Mode of Conduct of meeting: Offline & online

S.No	Name of the Member	Signature of the Member	Mobile number
1	Dr. D. Chenna Rao		9260740108
2	Prof .K.Deepthi		
3	Dr. K. Jhansi Lakshmi	K. Jhansi Lakshmi 31/11/22	9441236409
4	Sri .V. Mallikarjuna Sarma		8341546804
5	Dr.B.Ramesh Babu		
6	V. Sanjeeva Kumar	V. S b sk	9849324960
7	T.V.V.Satya Narayana	T. V. V. Satya 31/11/22	9490874913
8	P. Vijay Kumar	P. Vijay 31/11/22	9652023082
9	V. Rambabu		9948485537
10	G. Pavani		9912546493
11	Dr. N. Bujji Babu		99139428
12	Dr. Ch. Praveen	Ch. Praveen 31/11/22	979185578
13	V. Venkateswara Rao	V. Venkateswara Rao 31/11/22	9885165588
14	P.R. Ravi Varma		
15	K. Kushma Sowjanya		
16	N. Sudha Rani	N. Sudha Rani	9346396477

P.R.GOVERNMENTCOLLEGE(A), KAKINADA
DEPARTMENT OF CHEMISTRY
B.VOC(PHARMACEUTICAL CHEMISTRY)
(MATHSSTREAM)

SEMESTER -I

Category	Subject/Paper	Course	Theory /Practical	No.of Hrs./ Week	No ofcredi ts	Evaluation		
						Internal	External	TOTAL
Firstlanguage	ENGLISHPRAXISCOURSE-I		Theory	4	3	50	50	100
SecondLanguage	Telugu/Sanskrit/Hindi		Theory	4	3	50	50	100
LifeSkillCourses	ComputerApplications		Theory	2	2		50	50
SkillDevelopment Course	ElectricalAppliances		Theory	2	2		50	50
MajorSubject-1	Mathematics	C1	Theory	6	5	50	50	100
MajorSubject-2	Chemistry	C1	Theory	4	4	50	50	100
	Chemistry		Practical	2	1		50	50
Vocational	BasicPharmaceutics-I	C1	Theory	4	4	50	50	100
	BasicPharmaceutics-I		Practical	2	1		50	50
	BasicPharmaceutics-II	C2	Theory	2	2	-	50	50
	BasicPharmaceutics-II		Practical	2	1		50	50
			TOTAL	34	28	250	550	800

P.R.GOVERNMENTCOLLEGE(A), KAKINADA
DEPARTMENT OF CHEMISTRY
B.VOC(PHARMACEUTICAL CHEMISTRY)
(MATHSSTREAM)

SEMESTER - II

Category	Subject/Paper	Course	Theory /Practical	No.of Hrs./ Week	No ofcredi ts	Evaluation		
						Internal	External	TOTAL
Firstlanguage	ENGLISHPRAXISCOURSE-II		Theory	4	3	50	50	100
SecondLanguage	Telugu/Sanskrit/Hindi		Theory	4	3	50	50	100
LifeSkillCourses	InformationandCommunicationTech nology		Theory	2	2	-	50	50
SkillDevelopment Course-1	FoodAdulteration		Theory	2	2	-	50	50
SkillDevelopment Course-1	Dairy technology		Theory	2	2	-	50	50
MajorSubject-1	Mathematics	C2	Theory	6	5	50	50	100
MajorSubject-2	Chemistry	C2	Theory	4	4	50	50	100
	Chemistry		Practical	2	1		50	50
Vocational	BasicAnalyticalChemistry-I	C3	Theory	4	4	50	50	100
	BasicAnalyticalChemistry-I		Practical	2	1		50	50
	HealthEducationandCommunityPha rmacy	C4	Theory	2	2	-	50	50
	HealthEducationandCommunityPha Rmacy		Project	2	1	-	50	50
			TOTAL	36	30	250	600	850

**P.R.GOVERNMENT COLLEGE(A),
KAKINADA , DEPARTMENT OF CHEMISTRY
B.VOC(PHARMACEUTICAL CHEMISTRY)
(MATHS STREAM) CURRICULAR FRAMEWORK
(CREDIT TABLE)
Semester-III**

Category	Subject/Paper	Course	Theory /Practical	No. of Hrs ./ Week	No of credits	Evaluation		
						Internal	External	TOTAL
First language	ENGLISH PRACTICE COURSE-III		Theory	4	3	40	60	100
Second Language	Telugu/Sanskrit/Hindi		Theory	4	3	40	60	100
Life Skill Course-I	Environment Education		Theory	2	2	-	50	50
Life Skill Course-II	Personality Development and Leadership		Theory	2	2	-	50	50
Skill Development Course	Environment Audit		Theory	2	2	-	50	50
Major Subject-1	Mathematics	C3	Theory	6	5	40	60	100
Major Subject-2	Chemistry	C3	Theory	4	4	40	60	100
	Chemistry		Practical	2	1		50	50
Vocational	Advanced Pharmaceutics-I	C5	Theory	4	4	40	60	100
	Advanced Pharmaceutics-I		Practical	2	1		50	50
	Advanced Pharmaceutics-II	C6	Theory	2	2	-	50	50
	Advanced Pharmaceutics-II		Project	2	1	-	50	50
			TOTAL	36	30	200	650	850

P.R.GOVERNMENT COLLEGE(A), KAKINADA
DEPARTMENT OF CHEMISTRY
B.VOC(PHARMACEUTICAL CHEMISTRY)
(MATHS STREAM) CURRICULAR FRAMEWORK
(CREDIT TABLE)
Semester-IV

Category	Subject/Paper	Course	Theory /Practical	No.of Hrs./ Week	No of credits	Evaluation		
						Internal	External	TOTAL
Major Subject-1	Mathematics	C4	Theory	6	5	40	60	100
	Mathematics	C5	Theory	6	5	40	60	100
Major Subject-2	Chemistry	C4	Theory	4	4	40	60	100
	Chemistry		Practical	2	1		50	50
	Chemistry	C5	Theory	4	4	40	60	100
	Chemistry		Practical	2	1		50	50
Vocational	Basic Analytical Chemistry-II	C7	Theory	4	4	40	60	100
	Basic Analytical Chemistry-II		Practical	2	1		50	50
	Industrial Safety and Management	C8	Theory	4	4	40	60	100
	Industrial Safety and Management		Practical	2	1		50	50
			TOTAL	36	30	300	500	800

P.R.GOVERNMENT COLLEGE(A), KAKINADA
DEPARTMENT OF CHEMISTRY
B.VOC(PHARMACEUTICAL CHEMISTRY)
(MATHS STREAM) CURRICULAR FRAMEWORK
(CREDIT TABLE)

Semester-V

Subject/Paper	Theory /Practical	No of credits	Evaluation
First Phase of Apprenticeship between 1st and 2nd year (Summer Vacation)		04	100
Second Phase of Apprenticeship between 2nd and 3rd year (Summer Vacation)		04	100
INDUSTRIAL INTERNSHIP		12	200
TOTAL		20	400

P.R.GOVERNMENT COLLEGE(A), KAKINADA
DEPARTMENT OF CHEMISTRY
B.VOC(PHARMACEUTICAL CHEMISTRY)
(MATHS STREAM) CURRICULAR FRAMEWORK
(CREDIT TABLE)
Semester – VI

Category	Subject/Paper	Course	Theory /Practical	No.of Hrs./ Week	No of credits	Evaluation			
						Internal	External	TOTAL	
Vocational	PharmaRegulatoryAffairs	C9	Theory	4	4	40	60	100	
	PharmaRegulatoryAffairs		Practical	2	1		50	50	
	PharmaceuticalInorganicChemistry	C10	Theory	4	4	40	60	100	
	PharmaceuticalInorganicChemistry		Practical	2	1		50	50	
	AdvancedAnalyticalChemistry	C11	Theory	4	4	40	60	100	
	AdvancedAnalyticalChemistry		Practical	2	1		50	50	
	BasicQualityControlandQualityAssurance	C12	Theory	4	4	40	60	100	
	BasicQualityControlandQualityAssurance		Practical	2	1		50	50	
	DocumentationforQualityControl	C13	Theory	4	4	40	60	100	
	DocumentationforQualityControl		Practical	2	1		50	50	
	Pharmaceuticaland MedicinalChemistry	C14	Theory	4	4	40	60	100	
	Pharmaceuticaland MedicinalChemistry		Practical	2	1		50	50	
				TOTAL	36	30	240	660	900

P.R.GOVERNMENTCOLLEGE(A),KAKINADA
DEPARTMENTOFCHEMISTRY
B.VOC(PHARMACEUTICALCHEMISTRY)
(BIOLOGYSTREAM)CURRICULARFRAMEWORK(CREDITSTABLE)
SEMESTER-I

Category	Subject/Paper	Course	Theory /Practical	No. ofHrs ./ Week	No ofcredi ts	Evaluation		
						Internal	External	TOTAL
First language	ENGLISHPRAXISCOURSE-I		Theory	4	3	50	50	100
Second Language	Telugu/Sanskrit/Hindi		Theory	4	3	50	50	100
Life Skill Course	Computer Applications		Theory	2	2	-	50	50
Skill Development Course	Plant nursery		Theory	2	2	-	50	50
MajorSubject-1	Botany	C1	Theory	4	4	50	50	100
	Botany		Practical	2	1		50	50
MajorSubject-2	Chemistry	C1	Theory	4	4	50	50	100
	Chemistry		Practical	2	1		50	50
Vocational	Basic Pharmaceutics-I	C1	Theory	4	4	50	50	100
	Basic Pharmaceutics-I		Practical	2	1		50	50
	Basic Pharmaceutics-II	C2	Theory	2	2	-	50	50
	Basic Pharmaceutics-II		Practical	2	1		50	50
			TOTAL	34	28	250	600	850

P.R.GOVERNMENTCOLLEGE(A),KAKINADA
DEPARTMENTOFCHEMISTRY
B.VOC(PHARMACEUTICALCHEMISTRY)
(BIOLOGYSTREAM)CURRICULARFRAMEWORK
(CREDITSTABLE)
SEMESTER-II

Category	Subject/Paper	Course	Theory /Practical	No. ofHrs ./ Week	No ofcredi ts	Evaluation		
						Internal	External	TOTAL
First language	ENGLISHPRAXISCOURSE-II		Theory	4	3	50	50	100
Second Language	Telugu/Sanskrit/Hindi		Theory	4	3	50	50	100
Life Skill Courses	Information and CommunicationTechnology		Theory	2	2	-	50	50
Skill Development Course-1	Food Adulteration		Theory	2	2	-	50	50
Skill Development Course-2	Fruits and vegetables preservation		Theory	2	2	-	50	50
MajorSubject-1	Botany	C2	Theory	4	4	50	50	100
	Botany		Practical	2	1		50	50
MajorSubject-2	Chemistry	C2	Theory	4	4	50	50	100
	Chemistry		Practical	2	1		50	50
Vocational	Basic Analytical Chemistry-I	C3	Theory	4	4	50	50	100
	Basic Analytical Chemistry-I		Practical	2	1		50	50
	Health Education and Community Pharmacy	C4	Theory	2	2	-	50	50
	Health Education and Community Pharmacy		Project	2	1	-	50	50
			TOTAL	36	30	250	650	900

P.R.GOVERNMENTCOLLEGE(A),KAKINADA
DEPARTMENTOFCHEMISTRY
B.VOC(PHARMACEUTICALCHEMISTRY)
(BIOLOGYSTREAM)CURRICULARFRAMEWORK
(CREDITSTABLE)
SEMESTER-III

Category	Subject/Paper	Course	Theory /Practical	No. ofHrs ./ Week	No ofcredi ts	Evaluation		
						Internal	External	TOTAL
First language	ENGLISHPRAXISCOURSE-III		Theory	4	3	40	60	100
Second Language	Telugu/Sanskrit/Hindi		Theory	4	3	40	60	100
Life Skill Course-I	Environment Education		Theory	2	2	-	50	50
Life Skill Course-II	Personality Development and Leadership		Theory	2	2	-	50	50
Skill Development Course	Environment Audit		Theory	2	2	-	50	50
MajorSubject-1	Botany	C3	Theory	4	4	40	60	100
	Botany		practical	2	1		50	50
MajorSubject-2	Chemistry	C3	Theory	4	4	40	60	100
	Chemistry		Practical	2	1		50	50
Vocational	Advanced Pharmaceutics-I	C5	Theory	4	4	40	60	100
	Advanced Pharmaceutics-I		Practical	2	1		50	50
	Advanced Pharmaceutics-II	C6	Theory	2	2	-	50	50
	Advanced Pharmaceutics-II		Project	2	1	-	50	50
			TOTAL	36	30	200	700	900

P.R.GOVERNMENT COLLEGE(A), KAKINADA
DEPARTMENT OF CHEMISTRY
B.VOC(PHARMACEUTICAL CHEMISTRY)
(BIOLOGY STREAM) CURRICULAR FRAMEWORK
(CREDIT TABLE)

Semester-IV

Category	Subject/Paper	Course	Theory /Practical	No. of Hrs ./ Week	No of credits	Evaluation		
						Internal	External	TOTAL
Major Subject-1	Botany	C4	Theory	4	4	40	60	100
	Botany		Practical	2	1		50	50
	Botany	C5	Theory	4	4	40	60	100
	Botany		Practical	2	1		50	50
Major Subject-2	Chemistry	C4	Theory	4	4	40	60	100
	Chemistry		Practical	2	1		50	50
	Chemistry	C5	Theory	4	4	40	60	100
	Chemistry		Practical	2	1		50	50
Vocational	Basic Analytical Chemistry-II	C7	Theory	4	4	40	60	100
	Basic Analytical Chemistry-II		Practical	2	1		50	50
	Industrial Safety and Management	C8	Theory	4	4	40	60	100
	Industrial Safety and Management		Practical	2	1		50	50
			TOTAL	36	30	255	645	900

P.R.GOVERNMENT COLLEGE(A), KAKINADA
DEPARTMENT OF CHEMISTRY
B.VOC(PHARMACEUTICAL CHEMISTRY)
(BIOLOGY STREAM) CURRICULAR FRAMEWORK
(CREDIT TABLE)

Semester-V

Subject/Paper	Theory /Practical	No of credits	Evaluation
First Phase of Apprenticeship between 1 st and 2 nd year (Summer Vacation)		04	100
Second Phase of Apprenticeship between 2 nd and 3 rd year (Summer Vacation)		04	100
INDUSTRIAL INTERNSHIP		12	200
TOTAL		20	400

P.R.GOVERNMENT COLLEGE(A), KAKINADA
DEPARTMENT OF CHEMISTRY
B.VOC(PHARMACEUTICAL CHEMISTRY)
(BIOLOGY STREAM) CURRICULAR FRAMEWORK
(CREDIT TABLE)

Semester – VI

Category	Subject/Paper	Course	Theory /Practical	No. of Hrs ./ Week	No of credits	Evaluation			
						Internal	External	TOTAL	
Vocational	Pharma Regulatory Affairs	C9	Theory	4	4	40	60	100	
	Pharma Regulatory Affairs		Practical	2	1		50	50	
	Pharmaceutical Inorganic Chemistry	C10	Theory	4	4	40	60	100	
	Pharmaceutical Inorganic Chemistry		Practical	2	1		50	50	
	Advanced Analytical Chemistry	C11	Theory	4	4	40	60	100	
	Advanced Analytical Chemistry		Practical	2	1		50	50	
	Basic Quality Control and Quality Assurance	C12	Theory	4	4	40	60	100	
	Basic Quality Control and Quality Assurance		Practical	2	1		50	50	
	Documentation for Quality Control	C13	Theory	4	4	40	60	100	
	Documentation for Quality Control		Practical	2	1		50	50	
	Pharmaceutical and Medicinal Chemistry	C14	Theory	4	4	40	60	100	
	Pharmaceutical and Medicinal Chemistry		Practical	2	1		50	50	
				TOTAL	36	30	255	645	900

P.R.GOVERNMENTCOLLEGE(AUTONOMOUS)KAKINADA
CURRICULARFRAMEWORKFORB.VOCOURSESUNDERNSQFFORTHEYEAR2020-21

B.Voc Pharmaceutical Chemistry(Maths stream/ Biology stream)

SUBJECT/SEMESTER		I		II		III		IV		V		VI					
		H/W	C	H/W	C	H/W	C	H/W	C	H/W	C	H/W	C				
English		4	3	4	3	4	3										
Second Language(Telugu/Hindi/Sanskrit)		4	3	4	3	4	3										
Life Skill Courses		2	2	2	2	2+2	2+2										
Skill Development Courses		2	2	2+2	2+2	2	2										
Core Subjects																	
MajorSubject-1	C1 to C5 Maths/Botany (Theory&Practicals)	6/4+2	4+1	6/4+2	4+1	6/4+2	4+1	4+2 4+2	4+1 4+1					ThirdPhaseofApprenticeshipfortheentireV/VISemester	UnderstandSecondPhase(2Spells)ofApprenticeshipbetween1stand2ndyearandbetween2ndand3rdyearSummerVacation		
MajorSubject-2	C1 to C5 Chemistry (Theory&Practicals)	4+2	4+1	4+2	4+1	4+2	4+1	4+2 4+2	4+1 4+1								
Vocational	C1toC14includingSECPHarmaceuticalChemistry(Theory&Practicals)	4+2	4+1	4+2	4+1	4+2	4+1	4+2 4+2	4+1 4+1	4+2	4+1	4+2	4+1				
	C2, C4, C6 (Theory and Lab/Institutional/IndustrialTraining PharmaceuticalChemistry)	2+2	2+1	2+2	2+1	2+2	2+1			4+2	4+1	4+2	4+1			4+2	4+1
TotalHrs/Week(AcademicCredits)		34	28	36	30	36	30	36	30	36	30		12			4	4
ExtensionActivities																	
NCC/NSS/Sports/ExtraCurricular									2								
Yoga							1		1								
ExtraCredits																	
Hrs/W(TotalCredits)		34	28	36	30	36	31	36	33	36	30		12	4	4		

Marks and Credits Distribution

S.No.	Course Type	No. of Courses	Course wise Teaching Hrs/Week	Credits for each Course	Total Credits	Each Course Evaluation				Total (Theory + Practical)	Total Marks (Maths Stream/Biology Stream)
						Theory			Practical (Maths Stream/Biology)		
						Continuous Assessment	End Semester	Total			
1	English	3	4	3	9	40	60	100		100	300
2	Second Language	3	4	3	9	40	60	100		100	300
3	Life Skill Courses	4	2	2	8	0	50	50		50	200
4	Skill Development Courses	4	2	2	8	0	50	50		50	200
5	Core/SE-I Maths/Botany	5	6/4+2	4+1	25	40	60	100	0/50	100/150	500/750
6	Core/SE-II Chemistry	5	4+2	4+1	25	40	60	100	0/50	100/150	750
7	Vocational Courses (C1 to C14) Pharmaceutical Chemistry	11	4+2	4+1	55	40	60	100	50	150	1650
	Vocational Courses C2, C4, C6 Pharmaceutical Chemistry	3	2+2	2+1	9		50	50	50	100	300
8	Summer Vacation Internship	2		4	8					100	200
9	Industrial Internship for one Full Semester	1		12	12					200	200
10	Extension Activities (Non Academic Credits)										
	NCC/NSS/Sports/Extra Curricular			2	2						
	Yoga	2		1	2						
	Extra Credits										
	Hrs/W (Total Credits) & Marks	43			172						4600/4850

PITHAPURRAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS),KAKINADA**B.VOC COURSES UNDER NSQF SCHEME****STUDENTS ELIGIBILITY AND FACULTY ELIGIBILITY**


S.NO	NAME OF THE COURSE	STUDENTS ELIGIBILITY (10+2OEQUIVALENTWITHSPECIFIC GROUP IF ANY)	FACULTY ELIGIBILITY WITH SPECIALIZATION
1	B.VOC(COMMERCIAL AQUACULTURE)	Intermediate/10+2or Equivalent with Bi.P.C/Biology	M.Sc Aquaculture/Marine Biology/ Zoology with fishery biology specialization
2	B.VOC(HORTICULTURE)	Intermediate/10+2 or Equivalent with Bi.P.C/Biology	M.Sc Horticulture/Biology/BotanywithHorticulture Specialization
3	B.VOC(PHARMACEUTICAL CHEMISTRY)	Intermediate or10+2 with MPC/BiPC group	M.Pharm/M.Sc (PharmaceuticalChemistry) /M.Sc(Chemistry)
4	B.VOC(FOOD TECHNOLOGY)	Intermediate or 10+2with MPC/BiPC group	M.Sc (FoodTechnology)/ M.Sc (Food Processing) /M.Sc (Food and Nutrition)
5	B.VOC(JOURNALISM AND MASS COMMUNICATION)	Intermediate or 10+2 or equivalent	M.A(Journalism)
6	B.VOC(HOTEL MANAGEMENT)	Intermediate/ 10+2 or equivalent	MBA(Hotel Management/ M.Com HotelManagement /M.Com or MBA with Diploma in Hotel Management

QUESTIONPAPERSETTERSFORB.VOC(PHARMACEUTICALCHEMISTRY)

The following paper setters for Vocational (Pharmaceutical Chemistry) papers are recommended.

S. No.	Name of the Faculty	Designation	AddressforCorrespondence	Mobile Number	E-mailID
1	Sri V.Sanjeev Kumar	Lecturer in Chemistry	P.R. Government Degree College,Kakinada,EastGodavariDistrict.	9849324966	skvudi1972@gmail.com
2	V.Mallikarjuna Sarma	Lecturer in Chemistry	A.S.D.GOVERNMENT COLLEGE for women (A),Kakinada Kakinada,EastGodavari District.	9676822550	V.mallikarjunasarma@gmail.com
3	Sri V.Sridhar	Lecturer in Chemistry	Government arts college (A), RAJAMUNDRY, EastGodavari District	8919262964, 7386048119	sridhar.vegi07@gmail.com
4	Dr.B. Mallikarjuna	Lecturer in Chemistry	GovernmentCollege(Autonomous), Rajahmundry	8985503523	mallik.chem@gmail.com
5	Sri B.Venkata Rao	Lecturer in Chemistry	Government arts college (A), RAJAMUNDRY, EastGodavari District	9948195459	venkatbasa@gmail.com
6	Smt. Manchiraju Padmaja	Lecturer in Chemistry	Government arts college (A), RAJAMUNDRY, EastGodavariDistrict	9441653995	padmaja717@gmail.com

SEMESTER-I

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE BASIC PHARMACEUTICS-I	I B. Voc., Pharmaceutical chemistry (I Semester)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites	fundamental knowledge on different conventional dosage forms.	60	10	30	4+1

Course Objectives:

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

- Know the types of dosage forms
- Understand the professional way of handling the prescription
- Preparation of various conventional dosage forms
- Packaging materials, their classification and functions

Course Outcomes:

On Completion of the course, the students will be able to	
CO1	Course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms
CO2	Know the types of dosage forms.
CO3	Understand the professional way of handling the prescription
CO4	Preparation of various conventional dosage forms

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
--------------------------	--	----------------------	--	-------------------------	--

Syllabus:

UNIT-I

Pharmaceutical Dosage forms

Definition & classification with examples (based on routes of administration, on physical states and topical dosage forms). Additives or excipients & their importance in the dosage forms. Need for conversion of drugs into dosage forms

UNIT-II

Solid Dosage forms-I(Tablets)

Definition- Types of Tablets with examples, Advantages of tablets. Essential qualities of a good tablet. Active Ingredients (Excipients) used in the formulation of tablets. Methods of manufacturing of tablets. Reasons for the use of granules in tablet preparation, Tablet coating

UNIT-III

Solid Dosage forms-II(Capsules)

Capsules- definition, types of capsules–Preparation, advantages and disadvantages of Hard Gelatin Capsules-Preparation, advantages and disadvantages of Soft Gelatin Capsules, packing and storage of capsules, special types of capsules, difficulties in filling the capsules.

UNIT-IV

Packaging of Pharmaceuticals:

Characteristics of containers and closures-classification of containers–materials used for the construction of containers -Glass-Plastic-Metals-Paper-Materials used for the construction of closures-closure Liners-Aerosols-Introduction to aerosol packaging

UNIT –V

Evaluation and quality control screening:

Evaluation and quality control tests for tablets: Appearance, uniformity of content, hardness, friability, weight uniformity, disintegration & dissolution. Manufacturing defects in Tablets.

Evaluation and quality control tests for capsules

Textbooks:

1. A Textbook of Pharmaceuticals Formulation by B.M.Mithal, VallabhPrakashan.
2. The Theory and Practice of Industrial Pharmacy. Leon Lachman, Herbert Lieberman and Joseph Kanig, Editors, Lea and Febiger, Philadelphia. Latest edition Varghese publishing House
3. Indian Pharmacopoeia, Gov. of India Publication.

Reference books:

Indian Pharmacopoeia, Govt. of India Publication.

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

P01 : Knowledge in Pharmaceutical Chemistry : Apply the knowledge of different dosage forms and their routes of administration.

P02: Problem analysis: Identify, formulate, review research literature, and analyze simple to complex problems reaching substantiated conclusions using fundamental principles of pharmaceutical chemistry.

P03: Design/development of solutions: Design solutions for simple to complex problems and designing novel routes for the synthesis of bioactive / active pharmaceutical ingredients.

P04: 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.

P05 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for drug modeling and interpretation of simple to complex drug molecules.

P06 : Society: Applying the contextual knowledge to assess societal, health, safety, legal issues.

P07: 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.

P08 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmaceutical manufacturing practice.

P09 : Communication: Communicate effectively on issues related to pharmaceutical chemistry with the medical community, being able to write the effective reports and documentations and presentations.

P010: 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

P.R.GOVERNMENT COLLEGE(A),KAKINADA

B.Voc(PHARMACEUTICAL CHEMISTRY)

FIRST YEAR SEMESTER Course-

1: BASIC PHARMACEUTICS-I

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	

MODEL QUESTION PAPER

Time 2hrs

Max.Marks-50

SECTION-A

Answer any **THREE** questions choosing at least **ONE** question from each section

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-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

UNIT:I

1. Explain the classification of pharmaceutical dosage forms based on
 - i. Physical state
 - ii. Route of administration
2. What are additives? Write the role and importance in dosage forms.

UNIT:II

1. Write any two methods of preparation of tablets.
2. Define tablet and write different types of tablets.
3. Write about the active ingredients used in the formulation of the tablet

UNIT:III

1. Explain the preparation of hard gelatin capsules.
2. Explain the preparation of soft gelatin capsules.

UNIT:IV

1. Write the characteristics of containers and closers.
2. Write an assay on glass containers.
3. Explain an assay on plastic containers.
4. Explain different types of materials used in the construction of closers.

UNIT -V

1. Explain manufacturing defects in tablets.
2. Explain the evaluation and quality control tests for capsules.

ShortQuestions

UNIT-I

1. Define formulations. Write a note on topical dosage forms.
2. Explain the need for conversion of drugs into dosage forms.

UNIT-II

1. Define tablet and write different types of tablets.
2. What are the advantages and essential qualities of tablet dosage forms.
3. Write about various coatings of tablets.

UNIT-III


1. What are the advantages and disadvantages of soft gelatin capsules.
2. What are the advantages and disadvantages of hard gelatin capsules.
3. What are capsules? Write different types of capsules.
4. Write about the difficulties in filling the capsule.

UNIT-IV

1. Write a note on metals used in the construction of containers.
2. Write a note on paper used in the construction of containers.
3. Explain the principle of aerosol container.
4. Write the applications of aerosol packaging


UNIT-V

1. write a note on hardness, friability
2. Write a note on dissolution and disintegration

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (I Semester)			
Course Code	TITLE OF THE COURSE BASIC PHARMACEUTICS- I PRACTICAL				
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	fundamental knowledge on different conventional dosage forms.	-	-	30	4+1

Syllabus:

1. Preparation and submit paracetamol elixir
2. Preparation and submit sucrose syrup
3. Preparation and submit aqueous iodine solution
4. Preparation and submit ORS powder
5. Preparation and submit turpentine linement

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE BASIC PHARMACEUTICS-II	I B. Voc., Pharmaceutical chemistry (I Semester)			
Teaching	Hours Allocated: 30 (Theory)	L	T	P	C
Pre-requisites	fundamental knowledge on prescription	30	10	30	2+1

Course Objective

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

- Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
- Understand the professional way of handling the prescription
- Preparation of various conventional dosage forms

Course Outcomes:

On Completion of the course, the students will be able to	
CO1	course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms
CO2	Know the types of dosage forms.
CO3	Understand the professional way of handling the prescription
CO4	Preparation of various conventional dosage forms

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
--------------------------	--	----------------------	--	-------------------------	--

Syllabus:

UNIT – I:

Pharmaceutical Solutions:

Introduction – Types of Pharmaceutical Solutions – Explanation with examples –Quality attributes – Formulation components – stability of solutions – physical, chemical and microbial stability.

Unit – II:

Metrology (Weights and Measures):

Imperial System, metric system ,conversions from Imperial to metric and metric to Imperial systems –

calculations based on Imperial and metric systems-Alcohol Dilutions-Alligation methods-Isotonic solutions- molecular concentration- -sodium chloride equivalents.

Unit – III:

Posology

Definition – Factors influencing dose of a drug – Pediatric dosage – dose calculations – doses proportionate to age - Young’s Formula, Dilling’s Formula and Clark’s Formula – Doses proportionate to surface area. Dose, route of administration and uses of some drugs: Ampicillin, Ascorbic acid, aspirin and Caffeine.

Unit – IV:

Prescription-I

Definition - parts of a prescription — principles of dispensing and handling the prescription - receiving, reading and checking the prescription, modern methods of prescribing, source of errors in prescription, care required in dispensing the prescription.

Unit –V

Prescription-II

incompatibilities in prescription – types of incompatibilities in prescription (physical, chemical and therapeutic).percentage calculations, temperature measurement calculations

REFERENCE BOOKS

Pharmaceutics II by Dr.Sambath kumar,Dr.Muruges.

Pharmaceutics I by Dr.Sambath kumar,Dr.Muruges.

Pharmaceutics –II by R.M.Mehta

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

P01 : Knowledge in Pharmaceutical Chemistry : Apply the knowledge of different dosage forms and their routes of administration.

P02: Problem analysis: Identify, formulate, review research literature, and analyze simple to complex problems reaching substantiated conclusions using fundamental principles of pharmaceutical chemistry.

P03: Design/development of solutions: Design solutions for simple to complex problems and designing novel routes for the synthesis of bioactive / active pharmaceutical ingredients.

P04: 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.

P05 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for drug modeling and interpretation of simple to complex drug molecules.

P06 : Society: Applying the contextual knowledge to assess societal, health, safety, legal issues.

P07: 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.

P08 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmaceutical manufacturing practice.

P09 : 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

P.R.GOVERNMENT COLLEGE (A), KAKINADA

B.Voc (PHARMACEUTICAL CHEMISTRY)

FIRST YEAR I SEMESTER

Weightage to content

Course – 2: BASIC PHARMACEUTICS-II

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	

MODEL QUESTION PAPER

Time 2hrs

Max.Marks-50

SECTION-A

Answer any THREE questions choosing at least ONE question from each section

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-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

P.R.GOVERNMENT COLLEGE (A), KAKINADA

B.Voc (PHARMACEUTICAL CHEMISTRY)

FIRST YEAR I SEMESTER

Course – 2: BASIC PHARMACEUTICS-II

QUESTION BANK

(Essay questions 10 marks)

UNIT – I:

1. Explain different types of pharmaceutical solutions.
2. Explain different formulation components in oral solution dosage forms.
3. Explain different quality attributes in pharmaceutical solutions.

UNIT – II:

1. Write an essay on metric system and imperial system.
2. Answer the following.
 - i. What is allegation method for alcohol dilution?
 - ii. Calculate the volume of each of 90%, 60%, 30% and water are required to produce 500ml of 50% of alcohol.

UNIT – III:

1. Write the factors influencing the dose of a drug.
2. Write dose, route of administration and uses of the following drugs:
Ampicillin, Ascorbic acid, aspirin and Caffeine.

UNIT – IV:

1. Define prescription. Explain different parts of prescription.
2. Describe about handling of a prescription and modern methods for prescribing

UNIT-V

1. Explain different types of incompatibilities in prescriptions.
2. Answer the following:
 - i. prepare 500ml of a 1 in 4000 solution from 1 in 800 solution
 - ii. prepare 100ml of phenol glycerine

SHORT ANSWER QUESTIONS

UNIT-I

1. Explain physical stability and chemical stability of pharmaceutical solutions.
2. Explain microbial stability of pharmaceutical solutions.

UNIT – II:

1. Write a note on conversion of metric system in to imperial system.
2. Write a note on isotonic solutions
3. Define sodium chloride equivalent. Calculate the gram of sodium chloride needed to make 30 ml of a 2% isotonic physostigmine salicylate solution using sodium chloride equivalent method.
(Given E value of physostigmine salicylate = 0.16)

UNIT – III:


1. Define Posology. Write Young's formula and Dilling's formula for calculation of children's dose.
2. Define Posology. Write Clark's formula and formula based on surface area for calculation of children's dose.

UNIT – IV:

1. Write a note on parts of the prescription.
2. Write a note on source of errors in prescription
3. Write about the care required for dispensing the prescription.

UNIT-V


1. Write about physical incompatibilities in prescription
2. Write about chemical incompatibilities in prescription
3. Convert 120°F into °C and 30°C into °F.

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (I Semester)			
Course Code	TITLE OF THE COURSE BASIC PHARMACEUTICS- II PRACTICAL				
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	fundamental knowledge on different conventional dosage forms.	-	-	30	2+1

Practicals:

1. Preparation and standardization of 0.1M HCl
2. Preparation and standardization of 0.1N H_2SO_4
3. Preparation and standardization of 0.1N NaOH
4. Preparation and standardization of 1M Oxalic acid
5. Preparation and standardization of 0.1N KMnO_4

SEMESTER-II

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (II Semester)			
Course Code	TITLE OF THE COURSE] BASIC ANALYTICAL CHEMISTRY-I				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites	Need to know about stoichiometric calculations	60	10	30	4+1

Course Objectives:

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

- Understand the preparation of standard solutions.
- Understand different theories of acids and bases.
- Learn stoichiometric reactions

Course Outcomes:

On Completion of the course, the students will be able to	
CO1	Understand the uses of acids and bases in pharmaceutical formulations
CO2	Calculate the oxidation number and its importance in redox reactions
CO3	Learn the theoretical principles of inorganic qualitative analysis.
CO4	Learn stoichiometric calculations

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
--------------------------	--	----------------------	--	-------------------------	--

Syllabus:

Unit-I Solutions.AcidsandBases

Solutions, solvent and solute of a true solution. –The Arrhenius theory with examples, Limitations- Bronsted-Lowry theory with examples and Limitations-Conjugate acid- base pairs with examples-Lewis Theory with examples — Role of acids and bases in Pharmacy. Uses of some acids and bases in Pharmaceutical formulations (Boric acid, Hydrochloric acid, Ammonia and Calcium Hydroxide).pH definition and calculation of pH of acids and base solutions. Buffer solutions. Definition and classification with examples. Role of buffers in Pharmacy. Selection of pharmaceutical buffers.

Unit-II Stoichiometry-I

Balancing chemical equations-Concept of mole, calculation of molecular weights and equivalent weights of acids (HCl, H₂SO₄, CH₃COOH & HNO₃), bases (NaOH, Ca(OH)₂), oxidizing (K₂Cr₂O₇, KMnO₄ in acid and alkaline media) and reducing agents (H₂C₂O₄, FeSO₄) and salts (NaCl, Na₂CO₃, K₂SO₄) with examples- Stoichiometric calculations involving weight-weight, weight-volume, mole-weight and mole - volume relations with examples. Oxidation state- Oxidation number- rules for calculation of oxidation numbers and calculation of oxidation numbers with examples (K₂Cr₂O₇, KMnO₄, H₂SO₄, Cr₂O₃, K₂CrO₄, MnO₂, MnSO₄, MnO₄⁻, Cr₂O₇²⁻)- Concept Of oxidation and reduction, oxidizing agent and reducing agent- Redox reactions With examples- Balancing of Redox equations in acid and alkaline media with examples. $\text{Fe}^{+2}(\text{aq}) + \text{Cr}_2\text{O}_7^{2-}(\text{aq}) \rightarrow \text{Fe}^{+3}(\text{aq}) + \text{Cr}^{+3}(\text{aq})$ (acid medium)



Unit-III Qualitative Analysis

Principles in qualitative analysis of inorganic salts- solubility product and common ion effect and their applications in qualitative inorganic analysis- Reactions of carbonate, chloride, nitrate and Sulphate and acetate ions- chromyl chloride test, brown ring test. Reactions of ammonium, lead, cupric, Ferrous, Ferric, Zinc and Magnesium ions.

Unit-IV Quantitative Analysis

Methods of expressing concentration- percent by weight, percent by volume, Molality, Molarity, and Normality- preparation of standard solutions of acids, bases, oxidizing and reducing agents.

Definition of terms: Titrant, titrand, analyte, endpoint and equivalence point, indicator, standard titrant, titration. Types of Titrations- Theory of Acid base Titrations- Acid- base indicators with examples, Theory of acid- base indicators, Choice of indicators. Theory of Redox titrations - Redox indicators with examples.

Textbooks:

1. Skoog, Fundamentals of Analytical Chemistry.
2. Vogel, Quantitative Chemical Analysis.
3. Cairns, Essential of Pharmaceutical Chemistry.

Reference books:

Indian Pharmacopoeia, Govt. of India Publication.

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

P01 : Knowledge in Pharmaceutical Chemistry : Apply the knowledge of different dosage forms and their routes of administration.

P02: Problem analysis: Identify, formulate, review research literature, and analyze simple to complex problems reaching substantiated conclusions using fundamental principles of pharmaceutical chemistry.

P03: Design/development of solutions: Design solutions for simple to complex problems and designing novel routes for the synthesis of bioactive / active pharmaceutical ingredients.

P04: 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.

P05 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for drug modeling and interpretation of simple to complex drug molecules.

P06 : Society: Applying the contextual knowledge to assess societal, health, safety, legal issues.

P07: 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.

P08 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmaceutical manufacturing practice.

P09 : Communication: Communicate effectively on issues related to pharmaceutical chemistry with the medical community, being able to write the effective reports and documentations and presentations.

P010: 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

P.R.GOVERNMENT COLLEGE(A),KAKINADA

B.Voc(PHARMACEUTICAL CHEMISTRY)

FIRST YEAR II SEMESTER

**Course-3: BASIC ANALYTICAL
CHEMISTRY-I**

WEIGHTAGE TO CONTENT

S No	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	2	2	30	Remembering, understanding
2.	UNIT-II	2	2	30	Analyzing, Remembering
3.	UNIT-III	1	2	20	Analyzing, Remembering
4.	UNIT-IV	1	1	15	Analyzing, Evaluating
	Total	6	7	95	

MODEL QUESTION PAPER

Time 2hrs

Max.Marks-50

SECTION-A

Answer any **THREE** questions choosing at least **ONE** question from each section

3x10=30M

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

SECTION-B

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

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-II
11. One question is to be set from unit-III
12. One question is to be set from unit-III
13. One question is to be set from unit-IV

QUESTION BANK
ESSAY QUESTIONS (10MARKS)

Unit-I

1. Explain (i)Bronsted Lowry Acid Base theory (ii)Arrhenius theory of acids and bases with examples.
2. Define buffer solution .Explain the classification of buffers .Explain the selection of pharmaceutical buffers.
3. Explain the role of acids and bases in pharmacy. Write the uses of Hydrochloric acid and Calcium Hydroxide in pharmaceutical formulations.

Unit-II

1. If 40g of Calcium carbonate is completely calcined, how much amount of CaO is formed? And how much volume of CO₂ is liberated?
2. The balanced equation for the synthesis of ammonia is
 $3\text{H}_2(\text{g})+\text{N}_2(\text{g})\rightarrow 2\text{NH}_3(\text{g})$.
Calculate:
 - a. The mass in grams of NH₃ formed from the reaction of 64.0g of N₂
 - b. The mass in grams of N₂ required for 1.00kg of NH₃.
3. A metal reacts with an acid to produce 78.4L of hydrogen gas at STP How many moles of H₂were produced?
4. Balance the following redox reaction by ion-electron method.
 $\text{Fe}^{+2}(\text{aq})+\text{Cr}_2\text{O}_7^{-2}(\text{aq})\rightarrow\text{Fe}^{+3}(\text{aq})+\text{Cr}^{+3}(\text{aq})$ (acid medium)
5. Balance the following redox reaction by ion-electron method
 $\text{MnO}_4^{-}(\text{aq})+\text{I}^{-}(\text{aq})\rightarrow\text{MnO}_2(\text{s})+\text{I}_2(\text{s})$ (alkaline medium)

Unit-III

1. Explain common ion effect. Write the applications of common ion effect in qualitative analysis.
2. Explain Solubility product. Write the applications of Solubility product in qualitative analysis.
3. Write the reactions of (i)Chloride and (ii) Ammonium ions.
4. Write the reactions of (i)Acetate and (ii)Lead ions.

Unit-IV

1. Explain (i)Quinonoid theory and (ii)Ostwald theory of acid-base indicators.
2. Define“Molarity”.How do you prepare a standard solution of 0.05M and 0.1N Na_2CO_3 ?
3. What are oxidizing agents? How do you prepare 0.02 N $\text{K}_2\text{Cr}_2\text{O}_7$ solution in acid medium?
4. Explain the theory of redox titrations.Write any two examples of redox indicators.

SHORTANSWERQUESTIONS(5M)

Unit-I

1. Explain Lewis theory with examples.
2. Define pH.Calculate the pH of 0.01M HNO_3 .
3. Define conjugate acid base pair. Give examples.

Unit-II


1. Define mole, calculate the molecular weights and equivalent weights of CH_3COOH , $\text{Ca}(\text{OH})_2$
2. Write about relation between mole-weight and mole-volume with examples.
3. Define Oxidation number and write rules for calculation of oxidation numbers and calculate the oxidation number of KMnO_4 .

Unit-III

1. Write the reactions of Nitrate ion.
2. Write the reactions of Cupric ion.
3. Write the reactions of Ferrous ion.


Unit-IV

1. Define the terms Titrant, titrand, analyte.
2. How do you prepare 250ml of 0.25M NaOH solution?
3. Explain the theory of acid-base titrations.

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (II Semester)			
Course Code	TITLE OF THE COURSE BASIC ANALYTICAL CHEMISTRY- I PRACTICAL				
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	To study about various stoichiometric calculations	-	-	30	4+1

Practicals:

1. Preparation of inorganic compounds
 - i. Potash alum
 - ii. Mohr salt
 - iii. Preparation of Boric acid
2. Assay of Ascorbic acid
3. Assay of Hydrogen Peroxide.
4. Determination of Iodine value of oils.

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (II Semester)			
Course Code	TITLE OF THE COURSE HEALTH EDUCATIO AND COMMUNITY PHARMACY				
Teaching	Hours Allocated: 30 (Theory)	L	T	P	C
Pre-requisites	To understand about health.	30	10	30	2+1

Course Objective

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

- Realization of current issues related to health and pharmaceutical problems within the country and world wide.
- Have a critical way of thinking based on current health care development.
- Evaluate alternative ways of solving problems related to health and pharmaceutical issues

Course Outcomes:

On Completion of the course, the students will be able to	
CO1	Gain knowledge about different types of health and determinants of health
CO2	Apply the concept by learning about first aid treatment
CO3	Gain knowledge about communicable and non-communicable diseases
CO4	Understand the concept of sexually transmitted diseases and create awareness among the uneducated people

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
--------------------------	--	----------------------	--	-------------------------	--

Syllabus:

UNIT1

Concept of Health:

Definition of physical Health, mental Health, social Health, spiritual Health, determinants of health, indicators of health, concept of disease, natural history of diseases, disease causing agents, concept of prevention of diseases

UNIT II

Nutrition and Health: Classification of foods, requirements, disease induced due to deficiency of proteins, vitamins and minerals –treatment and prevention

Demography and family planning-Demography cycle, fertility, family planning, contraceptive methods, behavioral methods, natural family planning methods, chemical methods, mechanical methods, hormonal contraceptives.

UNIT III

First Aid: Emergency treatment in shock, snake bite, burns, poisoning, heart diseases, fractures and resuscitation methods .Elements of minor surgery and dressings

UNIT IV

Communicable & Non communicable Diseases : Causative agents ,mode of transmission and prevention

Respiratory infections –Chicken pox, measles, influenza, whooping cough and TB

Intestinal Infections-polio myelitis, Hepatitis, cholera, Typhoid ,food poisoning, Arthropod

Infections- Malaria, filarial, plague, dengue

Surface infection- Rabies, Tetanus, Leprosy

Sexually transmitted diseases : Syphilis ,Gonorrhoea, AIDS

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

P01 : Knowledge in Pharmaceutical Chemistry : Apply the knowledge of different dosage forms and their routes of administration.

P02: Problem analysis: Identify, formulate, review research literature, and analyze simple to complex problems reaching substantiated conclusions using fundamental principles of pharmaceutical chemistry.

P03: Design/development of solutions: Design solutions for simple to complex problems and designing novel routes for the synthesis of bioactive / active pharmaceutical ingredients.

P04: 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.

P05 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for drug modeling and interpretation of simple to complex drug molecules.

P06 : Society: Applying the contextual knowledge to assess societal, health, safety, legal issues.

P07: 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.

P08 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmaceutical manufacturing practice.

P09 : 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

P.R.GOVERNMENT COLLEGE (A), KAKINADA

B.Voc (PHARMACEUTICAL CHEMISTRY)

FIRST YEAR II SEMESTER

Weightage to content

**Course – 4: HEALTH EDUCATION AND
COMMUNITY PHARMACY**

S No	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	2	2	30	Remembering, understanding
2.	UNIT-II	2	2	30	Analyzing, Remembering
3.	UNIT-III	1	2	20	Analyzing, Remembering
4.	UNIT-IV	1	1	15	Analyzing, Evaluating
	Total	6	7	95	

MODEL QUESTION PAPER

Time 2hrs

Max.Marks-50

SECTION-A

Answer any **THREE** questions choosing at least **ONE** question from each section

3x10=30M

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

SECTION-B

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

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-II
11. One question is to be set from unit-III
12. One question is to be set from unit-III
13. One question is to be set from unit-IV

P.R.GOVERNMENT COLLEGE (A), KAKINADA

B.Voc (PHARMACEUTICAL CHEMISTRY)

FIRST YEAR II SEMESTER

**Course – 4: HEALTH EDUCATION AND
COMMUNITY PHARMACY**

QUESTION BANK

(Essay questions 10 marks)

Unit-I

1. Explain the following.
Physical health
 - i. Mental health
 - ii. Social health
 - iii. Spiritual health
2. Explain determinants of health.
3. Explain indicators of health.

Unit-II

1. Explain deficiency diseases, treatment and prevention of diseases due to the deficiency of water soluble vitamins.
2. Define family planning. Write about various types of contraceptive methods.

Unit-III

1. Define first aid. Describe emergency treatment in shock and snake bite.
2. Define first aid. Describe emergency treatment in burns and poisoning.

Unit-IV

1. Explain causative agents, mode of transmission and prevention of chicken pox and rabies.
2. Explain causative agents, mode of transmission and prevention of poliomyelitis and Hepatitis.
3. Explain causative agents ,mode of transmission and prevention of chicken pox and rabies.
4. Explain causative agents ,mode of transmission and prevention of Syphilis and AIDS.

SHORTANSWERQUESTIONS(5M)

Unit-I

1. Describe briefly disease causing agents.
2. Write about the concept of prevention of diseases.

Unit-II


1. Write about classification of foods.
2. Write the diseases caused due to deficiency of proteins. Write the treatment and prevention for the deficiency of proteins.
3. Write a note on demography cycle.

Unit-III

1. Describe emergency treatment for fractures.
2. Write a note on dressings.


Unit-IV

1. What are communicable and non communicable diseases ? Give examples.
2. Write about causative agents, mode of transmission and prevention of malaria.
3. Write about causative agents ,mode of transmission and prevention of leprosy.

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE HEALTH EDUCATION AND COMMUNITY PHARMACY PRACTICAL	I B. Voc., Pharmaceutical chemistry (II Semester)			
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	To understand about health	-	-	30	2+1

PROJECT WORK

SEMESTER- III

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE ADVANCED PHARMACEUTICS –I	I B. Voc., Pharmaceutical chemistry (III Semester)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C

Course Objectives: After the successful completion of this course, the student will be able to

- Size reduction methods in the manufacture of tablets
- Size separation methods in the manufacture of tablets
- Different sterilization processes
- Manufacture of Parenterals

COURSE OUTCOMES

On Completion of the course, the students will be able to

CO1	Understand the concept of size reduction and illustration of various equipment's Used
CO2	Understand the concept of mixing and homogenizations and various equipments used for the process
CO3	Apply the sterilization process in the pharma industry using various types of sterilization process
CO4	Perform the manufacturing and evaluation of parenterals in an aseptic environment to prevent contamination

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
--------------------------	--	----------------------	--	-------------------------	--

Syllabus:

UNIT: I

Size reduction, objectives, and factors affecting size reduction, methods of size reduction- study of Hammer mill, ball mill, Fluid energy mill and Disintegrator.

Size separation-size separation by sifting, Official standards for powders, Sedimentation methods of size separation. Construction and working of Cyclone separator.

UNIT: II

Mixing and Homogenization-Liquid mixing and powder mixing, Mixing of semisolids. Study of Propeller mixer, planetary mixer, Silverson Mixer-Homogenizer, Hand homogeniser; double cone mixer; Triple Roller Mill

Clarification and Filtration –Theory of filtration, Filter media; Filter aids and selection of filters. Study of the following filtration equipments–Filter Press, Sintered Filters, Filter Candles, Metafilter.

UNIT: III

Sterilization– Concept of sterilization and its differences from disinfection–Thermal resistance of micro–organisms. Detailed study of the following sterilization process.

(i) Sterilization with moist heat, (ii) Dry heat sterilization,(iii) Sterilization by radiation,
(iv) Sterilization by filtration and (v) Gaseous sterilization.

UNIT : IV

Parenterals Preparations- Routes of administration of parental products-Types ofparental products-Formulation of parental products-Aseptic work to prevent contamination-Manufacturing of Parenterals-Evaluation of Parenterals.

Recommended Books:

1. Cooper and Gunn's Dispensing for Pharmaceutical Students, CBS publishers, Delhi
2. Cooper and Gunn's Tutorial Pharmacy, S.J. Carter.
3. Theory and practice of Industrial Pharmacy by Lachman.
4. Remington's, The Science and Practice of Pharmacy, Mack Publishing Co. Easton.

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

P01 : Knowledge in Pharmaceutical Chemistry : Apply the knowledge of different dosage forms and their routes of administration.

P02: Problem analysis: Identify, formulate, review research literature, and analyze simple to complex problems reaching substantiated conclusions using fundamental principles of pharmaceutical chemistry.

P03: Design/development of solutions: Design solutions for simple to complex problems and designing novel routes for the synthesis of bioactive / active pharmaceutical ingredients.

P04: 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.

P05 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for drug modeling and interpretation of simple to complex drug molecules.

P06 : Society: Applying the contextual knowledge to assess societal, health, safety, legal issues.

P07: 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.

P08 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmaceutical manufacturing practice.

P09 : Communication: Communicate effectively on issues related to pharmaceutical chemistry with the medical community, being able to write the effective reports and documentations and presentations.

P010: 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

P.R.GOVERNMENTCOLLEGE(A),KAKINADA
B.Voc (PHARMACEUTICAL
CHEMISTRY)FIRSTYEARSEMESTER-III
COURSE-5 ADVANCED PHARMACEUTICS-I

WEIGHTAGE TO CONTENT

S No	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	2	2	30	Understanding. Skill
2.	UNIT-II	2	2	30	Remembering, Understanding
3.	UNIT-III	2	2	30	Remembering, Knowledge
4.	UNIT-IV	2	2	30	Evaluating, Understanding
	Total	8	8	120	

P.R.GOVERNMENT COLLEGE (A), KAKINADA

B.Voc (PHARMACEUTICAL CHEMISTRY)

FIRST YEAR II SEMESTER

Course – 5: ADVANCED PHARMACEUTICS-I

Model Question Paper

Time 2hrs.30min

Max. Marks-60M

SECTION-A

Answer any THREE questions choosing at least ONE question from each section

4x10=40M

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

or

One question is to be set from unit-I

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

or

One question is to be set from unit-II

3. One question is to be set from unit-III

or

one question is to be set from unit-III

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

or

one question is to be set from unit-IV

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-II
11. One question is to be set from unit-III
12. One question is to be set from unit-III
13. One question is to be set from unit-IV
14. One question is to be set from unit-IV

QUESTION BANK
ESSAY QUESTIONS

UNIT -I

1. Write the factors affecting size reduction.
2. Explain the construction and working of hammer mill and ball mill.
3. Explain sedimentation methods for size separation.

UNIT-II

1. Describe working of silverson mixer homogenizer and hand homogeniser
2. Write an essay on (i) Filter press and (ii) Sintered filters.
3. Write an essay on (i) double cone mixer and (ii) Triple Roller mill.

UNIT-III

1. Explain the following.
 - i. Sterilization by filtration
 - ii. Sterilization by moist heat
2. Explain the following.
 - iii. Sterilization by radiation.
 - iv. Sterilization by Gas

UNIT-IV

1. Describe different routes of administration of Parenterals.
2. Describe the formulation of Parenterals.
3. Explain the steps involved in the manufacture of Parenteral preparations.

(SHORT QUESTIONS)

UNIT-I

1. Write a note on objectives of size reduction.
2. Write a short note on disintegrator.
3. Write a note on construction and working of fluid energy mill.
4. Write about official standards for powders.

UNIT-II


1. Write a note on homogenization and mixing.
2. Define clarification and filtration and write about filter media
3. write about filter candles and metafilter
4. write about propeller mixer and planetary mixer
5. Describe liquid mixing and powder mixing

UNIT-III

1. Explain the concept of sterilization. How does it differ from disinfection?
2. Write about thermal resistance of micro organisms.
3. Write a short note on dry heat.


UNIT-IV

1. What are the essential qualities of a parental product.
2. Define parental preparation and types of parental preparation

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE ADVANCED PHARMACEUTICS-I PRACTICAL	I B. Voc., Pharmaceutical chemistry (III Semester)			
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	fundamental knowledge on different conventional dosage forms.	-	-	30	4+1

PRACTICALS

- 1.Evaluation of factors effecting rate of filtration
- 2.Preparation and submit zinc starch dusting powder
3. Determination of particle size distribution by sieving method
- 4.Evaluate the Ibuprofen tablet by dissolution & disintegration method
5. .Preparation of ascorbic acid injection

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE ADVANCED PHARMACEUTICS-II	I B. Voc., Pharmaceutical chemistry (III Semester)			
Teaching	Hours Allocated: 30hrs (Theory)	L	T	P	C
Pre-requisites	fundamental knowledge on different ophthalmic and parenteral dosage forms.	30	10	30	2+1

Course Objectives: After the successful completion of this course, the student will be able to

- Learn about different semi solid dosage forms
- Learn about different ophthalmic dosage forms
- Different sterilization processes
- Manufacture of Parenterals

COURSE OUTCOMES

On Completion of the course, the students will be able to	
CO1	Understand the concept and different types of semi-solid dosage forms
CO2	Illustrate about routes of administration and different types of parenteral preparations
CO3	Formulate different kinds of ophthalmic preparations like eyedrops, eye lotions and eye ointments
CO4	Understand the concept of different kinds of cosmetics that we use in daily life.

Course with focus on employability / entrepreneurship / Skill Development Modules

Skill Development		Employability		Entrepreneurship	
--------------------------	--	----------------------	--	-------------------------	--

Syllabus:

UNIT - I:

SEMI SOLID DOSAGE FORMS

Definition, Types of semi solid dosage forms, Characteristics of an ideal ointment, classification of ointments, types of ointment bases, Advantages & Disadvantages of ointment bases, preparation of ointments-trituration method, fusion method, storage of ointments, evaluation tests of ointment

UNIT-II

STERILE DOSAGE FORMS

Definition of Parenterals, Advantages & Disadvantages of Parenterals, routes of

administration of Parenterals , types of Parenteral preparation , formulation of Parenteral preparations. Processing of Parenteral preparations. Evaluation of Parenteral preparations.

UNIT-III

OPHTHALMIC PRODUCTS

Definition, Characteristics of ideal ophthalmic products, types of ophthalmic products-eye drops-factors effecting formulation of eye drops, containers for eyedrop. Eye lotions-sodium chloride and sodium bicarbonate eye lotions. eye ointments-characteristics of .eye ointments –atropine. Eye suspension characteristics of .eye suspension. Contact lens-types of contact lens, storage solution of contact lens

UNIT-IV

DENTAL & COSMETIC PRODUCTS

Definition of Dentifrices, Characteristics of ideal Dentifrices, ingredients of Dentifrices, tooth paste, tooth powder.

Definition of cosmetics, classification of cosmetics

cold creams, lipsticks,deodorants, shampoos, shaving cream, sunscreen products and baby care products

REFERENCE BOOKS

Introduction to pharmaceutics II by A.K.Gupta,S.S.Bajaj pharmaceutics II by Dr.S.Sambath kumar,Dr.N,murgesh

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

P01 : Knowledge in Pharmaceutical Chemistry : Apply the knowledge of different dosage forms and their routes of administration.

P02: Problem analysis: Identify, formulate, review research literature, and analyze simple to complex problems reaching substantiated conclusions using fundamental principles of pharmaceutical chemistry.

P03: Design/development of solutions: Design solutions for simple to complex problems and designing novel routes for the synthesis of bioactive / active pharmaceutical ingredients.

P04: 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.

P05 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for drug modeling and interpretation of simple to complex drug molecules.

P06 : Society: Applying the contextual knowledge to assess societal, health, safety, legal issues.

P07: 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.

P08 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmaceutical manufacturing practice.

P09 : Communication: Communicate effectively on issues related to pharmaceutical chemistry with the medical community, being able to write the effective reports and documentations and presentations.

P010: 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

P.R.GOVERNMENTCOLLEGE(A),KAKINADA
B.Voc (PHARMACEUTICAL CHEMISTRY)
SECOND YEAREMESTER-III
COURSE-6 ADVANCED PHARMACEUTICS-II

WEIGHTAGE TO CONTENT

S No	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	2	1	25	Understanding. Skill
2.	UNIT-II	1	2	20	Remembering, Understanding
3.	UNIT-III	1	2	20	Remembering, Knowledge
4.	UNIT-IV	2	1	25	Evaluating, understanding
	Total	6	6	90	

P.R.GOVERNMENT COLLEGE (A), KAKINADA

B.Voc (PHARMACEUTICAL CHEMISTRY)

SECOND YEAR III SEMESTER

Course – 6: ADVANCED PHARMACEUTICS-II

Model Question Paper

Time 2hrs.

Max. Marks-50M

SECTION-A

Answer any THREE questions choosing at least ONE question from each section

3x10=30M

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

or

One question is to be set from unit-I

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

or

One question is to be set from unit-III

3. One question is to be set from unit-IV

or

one question is to be set from unit-IV

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-II

11. One question is to be set from unit-III

12. One question is to be set from unit-III

13. One question is to be set from unit-IV

P.R.GOVERNMENT COLLEGE (A), KAKINADA

B.Voc (PHARMACEUTICAL CHEMISTRY)

SECOND YEAR - III SEMESTER

Course - 6: ADVANCED PHARMACEUTICS-II

QUESTION BANK

ESSAY QUESTIONS (10M)

UNIT – I

1. Explain the classification of ointments
2. Explain the classification of ointment bases.
3. Explain the preparation of ointments by Trituration method.
4. Explain the preparation of ointments by Fusion method.

UNIT – II

1. Explain the formulation of Parenteral preparations.
2. Explain the processing of parenteral preparations.
3. Explain the evaluation aspects of Parenteral preparations.

UNIT – III

1. Explain the factors affecting the formulation of eye drops.
2. Describe different types of containers for eye drops.

UNIT – IV

1. Explain the ingredients of dentifrices.
2. Define cosmetics. Explain the classification of cosmetics.
3. Write briefly on the following.
 - i. Deodorants
 - ii. Shampoos
 - iii. Sunscreen
 - iv. Babycare products

SHORT ANSWER QUESTIONS (5M)

UNIT – I

1. Write the characteristics of an ideal ointment.
2. Write the advantages of ointment bases.
3. Explain the storage of ointments.

UNIT - II


1. Define Parenterals. Write advantages of Parenterals.
2. Define Parenterals. Write disadvantages of Parenterals.
3. Write different types of Parenteral preparations.
4. Write different routes of administration of Parenterals.

UNIT - III

1. What are ophthalmic preparations? Write different types of ophthalmic products.
2. Write the characteristics of ideal ophthalmic products.
3. Write the characteristics of eye ointments.
4. What are contact lens solutions? Write different types of contact lens.

UNIT - IV


1. Write the characteristics of ideal dentifrices.
2. Write the preparation of toothpaste.
3. Write the preparation of tooth powder

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE ADVANCED PHARMACEUTICS-II PRACTICAL	I B. Voc., Pharmaceutical chemistry (III Semester)			
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	fundamental knowledge on different ophthalmic and parenteral dosage forms.	-	-	30	2+1

PRACTICALS

1. Preparations involving ophthalmic preparation
2. Preparation of cold Creams
3. Preparation of vanishing cream
4. Preparation of benzoic acid Ointment (whitfield's ointment)
5. Preparation of shampoo

SEMESTER- IV

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE BASIC ANALYTICAL CHEMISTRY-II	I B. Voc., Pharmaceutical chemistry (IV Semester)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C

Course Objectives: After the successful completion of this course, the student will be able to
 Understand the theory and applications of different types of titrations.
 Understand the principle and steps involved in gravimetric analysis.
 Compare precision and accuracy

COURSE OUTCOMES

On Completion of the course, the students will be able to	
CO1	Understand various techniques used in drug analysis and quality control
CO2	Illustrate different types of methods used in the precipitation titrations
CO3	Learn about different types of errors and their correction to restore the accuracy and precision.
CO4	Learn about various types of reagents and their classification based on the mechanism of action

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
--------------------------	--	----------------------	--	-------------------------	--

Syllabus:

Unit-I:

Theoretical considerations and application in drug analysis and quality control of the following analytical techniques

1. Non-aqueous titrations
2. Complexometric titrations
3. Miscellaneous Methods of Analysis: Diazotization titrations, Kjeldahl method of nitrogen estimation, Karl-Fischer titration.

Unit-II:

Precipitation titration

Introduction, Mohr's method, Volhard's method, adsorption indicators and its use in precipitation titrations.

Gravimetric analysis-principle and steps involved in gravimetric analysis, co-precipitation and post precipitation. Limitations of gravimetric analysis.

Unit-III:

Errors and evaluation of analytical data

Error definition classification of errors (determinate and indeterminate errors), propagation of errors, absolute and relative error, accuracy and precision -methods of expressing accuracy and precision, confidence limits, significant figures and rules for computation of significant figures

Unit-IV:

Reagents & Solvent

Reagents, Solvents and their Classification:-Reagents: classification of reagents according to their action as, Acids, Bases, Salts, oxidizing, reducing, complexing, chelating and precipitating reagents with suitable examples.

Solvents: Classification of solvents as protic, aprotic and amphoteric solvents, Acidic basic and neutral solvents, polar and non polar solvents, aqueous and non-aqueous solvents. Explanation with suitable examples

Textbooks:

1. Pharmaceutical inorganic chemistry by Kazasoma sekhara Rao, Ch. Venkata Suresh.
2. Pharmaceutical inorganic chemistry by G.R. Chatwal.

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

P01 : Knowledge in Pharmaceutical Chemistry : Apply the knowledge of different dosage forms and their routes of administration.

P02: Problem analysis: Identify, formulate, review research literature, and analyze simple to complex problems reaching substantiated conclusions using fundamental principles of pharmaceutical chemistry.

P03: Design/development of solutions: Design solutions for simple to complex problems and designing novel routes for the synthesis of bioactive / active pharmaceutical ingredients.

P04: 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.

P05 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for drug modeling and interpretation of simple to complex drug molecules.

P06 : Society: Applying the contextual knowledge to assess societal, health, safety, legal issues.

P07: 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.

P08 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmaceutical manufacturing practice.

P09 : Communication: Communicate effectively on issues related to pharmaceutical chemistry with the medical community, being able to write the effective reports and documentations and presentations.

P010: 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

**P.R.GOVERNMENTCOLLEGE(A),KAKINADA
B.Voc (PHARMACEUTICAL CHEMISTRY)**

SECOND YEAREMESTER-IV

**COURSE-7 BASIC ANALYTICAL
CHEMISTRY-II**

WEIGHTAGE TO CONTENT

S No	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	2	2	30	Understanding. Skill
2.	UNIT-II	2	2	30	Remembering, Understanding
3.	UNIT-III	2	2	30	Remembering, Knowledge
4.	UNIT-IV	2	2	30	Evaluating, Understanding
	Total	8	8	120	

P.R.GOVERNMENT COLLEGE (A), KAKINADA

B.Voc (PHARMACEUTICAL CHEMISTRY)

SECOND YEAR IV SEMESTER

**Course – 7:-BASIC ANALYTICAL
CHEMISTRY-II**

Model Question Paper

Time 2hrs.30min

Max. Marks-60M

SECTION-A

Answer any THREE questions choosing at least ONE question from each section

4x10=40M

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

or

One question is to be set from unit-I

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

or

One question is to be set from unit-II

3. One question is to be set from unit-III

or

one question is to be set from unit-III

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

or

one question is to be set from unit-IV

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-II
11. One question is to be set from unit-III
12. One question is to be set from unit-III
13. One question is to be set from unit-IV
14. One question is to be set from unit-IV

QUESTION BANK (ESSAY QUESTIONS)

UNIT –I

1. Write the theory and applications of non- aqueous titrations.
2. Write the theory and applications of complexometric titrations.
3. Explain the estimation of nitrogen by Kjeldahl method.
4. Explain Carl Fisher titrations.

UNIT-II

1. Explain Mohr's method for the determination of chloride.
2. Explain Volhard's method for the determination of chloride.
3. What is gravimetric analysis? Write the steps involved in gravimetric analysis.

UNIT-III

1. Explain significant figures. Write rules for computation of significant figures.
2. Define errors. Explain different types of errors.
3. Define accuracy and precision. Write different ways of expressing accuracy and precision.

UNIT-IV

1. Explain the classification of solvents with examples.
2. Explain the classification of reagents with examples.

SHORT ANSWER QUESTIONS(5M)

UNIT-I

1. Write a note on diazotization titrations.
2. Write different types of complexometric titrations.

UNIT-II


1. Explain post precipitation.
2. Explain co-precipitation.
3. What are the advantages and disadvantages of gravimetric analysis?

UNIT-III

1. Write the differences between accuracy and precision.
2. Explain propagation of errors.
3. Write a note on confidence limits.


UNIT-IV

1. Explain Acidic basic and neutral solvents with examples.
2. Explain oxidizing, reducing, complexing reagents with examples

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (IV Semester)			
Course Code	TITLE OF THE COURSE BASIC ANALYTICAL CHEMISTRY –II PRACTICAL				
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	Study of various titrations.	-	-	30	4+1

PRACTICALS

1. Preparation of standardization of 0.02 M EDTA
2. Determination of Ca using EDTA
3. Determination of Ni using EDTA
4. Determination of chloride by Mohr's method
5. Determination of chloride by Volhard's method

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (IV Semester)			
Course Code	TITLE OF THE COURSE INDUSTRIAL SAFETY AND MANAGEMENT				
Teaching	Hours Allocated: 30hrs (Theory)	L	T	P	C
Pre-requisites	Fundamentals of industrial safety and management	30	10	30	2+1

Course Objectives: After the successful completion of this course, the student will be able to

- i. Understand the different types of hazards
- ii. Understand the different types of explosives.
- iii. Understand the different types of toxic gases

COURSE OUTCOMES

On Completion of the course, the students will be able to	
CO1	Learn the occupational health & safety
CO2	Learn the industrial safety & best practices.
CO3	Learn about toxic gases and explosions caused by them
CO4	Learn about the safety aspects in industry and quality management system

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
--------------------------	--	----------------------	--	-------------------------	--

Syllabus:

UNIT1:

Industrial hazards

Definition, examples –types of hazards- fire ,fire triangle concept, mechanism of fire ,Flash point ,fire point ,auto ignition temperature — lower and upper flammable limits — ignition source of major fires — classification of fires and exhaustion to deal them, fire protection measures, fire and emergency.

UNIT- II:

Toxicgases—classification, remedial measures, classification and hazardous materials. Noise and Vibration – effects and hazards of noise -control methods of noise-generation, nature & types of vibration- effects of vibration –control methods

Explosions:

Definition and classification of explosions. Mechanism Of explosion, incidents responsible for onset and hazards and accidents with flammable liquids and precautions.

UNIT–III

Occupational health and safety– elements of occupational health – industrial hygiene fundamental principles and industrial hygiene – housekeeping – Methods of good housekeeping –Housekeeping contests - the 5 ‘s’ concept – ergonomic –definition–impact of poor ergonomics and good ergonomics.

Loss Prevention - Classification of Losses - Losses in a manufacturing plant —reasons and suggested measures to minimize them

UNIT–IV

Industrial safety: Elements of industrial safety – unsafe act and unsafe condition-accidents– cause of accidents–remedial measures–personal protective equipment.

Effective Systems– Best Practices

Quality Management System(QMS)-ISO9000-

ISO14000AndISO14001Definitions ,Nature And Importance Of Management- Principles Of Management

Textbooks:

- 1.Elements of industrial hazards by Ratan Raj Tatiya
- 2.Fundamentals of industrial safety &health by Dr.K.U.Mistry, siddarth prakashan publishers, 2008.

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

P.R. GOVERNMENT COLLEGE(A),KAKINADA
B.Voc (PHARMACEUTICAL CHEMISTRY)
SECOND YEAREMESTER-IV
COURSE-8 INDUSTRIAL
SAFETY AND MANAGEMENT

WEIGHTAGE TO CONTENT

S No	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	2	2	30	Understanding, Skill
2.	UNIT-II	2	2	30	Remembering, Understanding
3.	UNIT-III	2	2	30	Remembering, Knowledge
4.	UNIT-IV	2	2	30	Evaluating, understanding
	Total	8	8	120	

P.R.GOVERNMENT COLLEGE (A), KAKINADA

B.Voc (PHARMACEUTICAL CHEMISTRY)

SECOND YEAR IV SEMESTER

Course –8: INDUSTRIAL SAFETY AND MANAGEMENT

Model Question Paper

Time 2hrs.

Max. Marks-50M

SECTION-A

Answer the following questions

4x10=40M

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

SECTION-B

Answer any FOUR questions

4x5=20M

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

QUESTION BANK

ESSAY QUESTIONS (10M)

UNIT-I

1. Explain the terms
A) Flash point B) Fire point
2. Explain ignition sources of major fires.
3. Classification of fires.
4. Write a note on fire & emergency.

UNIT-II

1. Explain the classification of explosion.
2. Explain the incidents responsible for onset of hazards & accidents
3. Write about classification of toxic gases.

UNIT-III

1. Explain the 5'S' concept.
2. What are ergonomics. Write the impact of poor & good ergonomics.
3. Explain the classification of losses.

UNIT-IV

1. What are the elements of industrial safety.
2. Explain the principles of management.
3. Define management & Explain nature and importance of management.

SHORT ANSWER QUESTIONS(5M)

UNIT-I

1. Write a short note on industrial hazards with examples.
2. Explain types of hazards.
3. Write a short note on mechanism of fire 'Fire triangle concept'

UNIT-II


1. What are the remedial measures for prevention of toxic gases.
2. Write a short note on noise control techniques.
3. What are the sources of noise in the industries.
4. What are the effects of noise pollution.

UNIT-III

1. Define OHS. What are the elements involved in OHS.
2. Write a short note on house keeping.
3. Write the reasons & suggest the measures to minimize the losses.

UNIT-IV


1. Write a note on personnel protective equipment.
2. What are the remedial measures to minimize the accidents
3. Write a note on ISO14001 STANDARD
4. Write a note on ISO14000 STANDARD

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (IV Semester)			
Course Code	TITLE OF THE COURSE INDUSTRIAL SAFETY AND MANAGEMENT PRACTICAL				
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	fundamentals of industrial safety and management.	-	-	30	2+1

PRACTICALS

1. Determination of PH metric titration of HCl using standard NaOH.
2. Determination of PH metric titration of Acetic acid using standard NaOH.
3. Determination of concentration of KMnO4 using colorimeter
4. Determination of concentration of thio cyanide using colorimeter

SEMESTER-V/VI

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE PHARMA REGULATORY AFFAIRS	I B. Voc., Pharmaceutical chemistry (V/VISemester)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites	fundamental knowledge about regulatory affairs	60	10	30	4+1

Course Objectives:

To make the student

- I. Understand the different types of hazards
- II. Understand the Good laboratory practices.
- III. Understanding the Investigation of new drug.

On Completion of the course, the students will be able to	
CO1	The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
CO2	The regulatory authorities and agencies governing the manufacture and sale of Laws pharmaceuticals
CO3	Know different and Acts that regulate pharmaceutical industry.
CO4	Learn marketing of pharmaceuticals

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
--------------------------	--	----------------------	--	-------------------------	--

Syllabus:

UNIT :1

Good laboratory Practice, responsibilities of personnel Standard operating procedure, Standard Testing procedure, Certificate of Analysis, Method of Analysis, good receipt note.

UNIT : II

Approval of new drugs-Investigational New Drugs (IND) submission, format & content of IND, content of investigator Brochure, general consideration of new drug Approval (NDA), specific requirements, content & format of NDA, manufacturing control requirement of NDA,

UNIT-III

GMP, ISO 9000, TQM, ICH, CGMP

UNIT:IV

Occupational Health and Hazards, Safety at workplace, Accident prevention techniques, Safety Management system, list of hazardous chemicals and handling of toxic and hazardous chemicals, acids, ether & etc.

Textbooks:

1. J.A Dean, analytical chemistry handbook, McGraw hill Inc., 1st Ed., 1995.
Ethical Guidelines for Biomedical research on human subjects 2000. Indian Council of Medical Research, New Delhi.
2. Goodman & Gilman: JG Hardman, LE Limbard, 10th Edn. McGraw Hill Publications, 2001.
3. Central Drugs Standard Control Organization. Good Clinical Practices- Guidelines for Clinical Trials on pharmaceutical Products in India. New Delhi: Ministry of Health; 2001.

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

P01 : Knowledge in Pharmaceutical Chemistry : Apply the knowledge of different dosage forms and their routes of administration.

P02: Problem analysis: Identify, formulate, review research literature, and analyze simple to complex problems reaching substantiated conclusions using fundamental principles of pharmaceutical chemistry.

P03: Design/development of solutions: Design solutions for simple to complex problems and designing novel routes for the synthesis of bioactive / active pharmaceutical ingredients.

P04: 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.

P05 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for drug modeling and interpretation of simple to complex drug molecules.

P06 : Society: Applying the contextual knowledge to assess societal, health, safety, legal issues.

P07: 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.

P08 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmaceutical manufacturing practice.

P09 : Communication: Communicate effectively on issues related to pharmaceutical chemistry with the medical community, being able to write the effective reports and documentations and presentations.

P010: 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

P.R.GOVERNMENT COLLEGE(A),KAKINADA

B.Voc

(PHARMACEUTICAL CHEMISTRY)

THIRD YEAR V/ VI SEMESTER

Course-9 PHARMAREGULATORY AFFAIRS

WEIGHTAGE TO CONTENT

S No	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	2	2	30	Understanding, Skill
2.	UNIT-II	2	2	30	Remembering, Understanding
3.	UNIT-III	2	2	30	Remembering, Knowledge
4.	UNIT-IV	2	2	30	Evaluating, Understanding
	Total	8	8	120	

MODEL QUESTION PAPER

Time 2hrs.30 min

Max.Marks-60

SECTION-A

Answer any THREE questions choosing at least ONE question from each section

4x10=40M

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

or

One question is to be set from unit-I

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

or

One question is to be set from unit-II

3. One question is to be set from unit-III

or

One question is to be set from unit-III

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

or

One question is to be set from unit-IV

Answer any FOUR questions

4x5=20M

5. One question is to be set from unit-I

6. One question is to be set from unit-I

7. One question is to be set from unit-II

8. One question is to be set from unit-II

9. One question is to be set from unit-III

10. One question is to be set from unit-III

11. One question is to be set from unit-IV

12. One question is to be set from unit-IV

QUESTION BANK

(ESSAY QUESTIONS)

UNIT-1

1. Write an essay on GLP
2. Why are the reserve samples maintained.
3. State the contents of S O P on handling of the rejecting material.

UNIT-II

1. What are the content of NDA.
2. What are the content of IND.
3. Explain the submission of IND.

UNIT-III

1. Write about ICH guidelines
2. Write about GMP and CGMP

UNIT-IV

1. Write a note on first aid
2. List out the hazardous chemicals in pharmaceuticals.
3. Describe various safety rules at work place.

SHORT QUESTIONS

UNIT-I

1. Write about certificate of Analysis
2. Write the principles of GLP
3. Write about generating STP

UNIT-II


1. Explain the content of investigator Brochure.
2. What are the specific requirements, content & format of NDA
3. What are the manufacturing control requirement of NDA.

UNIT-III

1. Define GMP protocol
2. Write a note on USFDA
3. Write a note on CDSCO


UNIT-IV

1. Write about personnel protective equipment
2. Write about fire extinguishers
3. Write about safety signs and signal

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (V/VI Semester)			
Course Code	TITLE OF THE COURSE PHARMA REGULATORY AFFAIRS PRACTICAL				
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	fundamental knowledge about regulatory affairs	-	-	30	4+1

Practicals:

1. Fraibility test for different solid dosage forms
2. Disintegration test for different solid dosage forms
3. Dissolution test for different solid dosage forms
4. Effect of drugs on locomotory activity by using Actophotometer
5. Analgesic activity by tail flick method

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE PHARMACEUTICAL INORGANIC CHEMISTRY	I B. Voc., Pharmaceutical chemistry (V/ VI Semester)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites	fundamental knowledge about impurities	60	10	30	4+1

Course Objectives:

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

- Understand the different types of impurities.
- Understand the different types of anti-oxidants.
- Understanding the radiopharmaceuticals

Course Outcomes:

On Completion of the course, the students will be able to	
CO1	Learn about various types of impurities in pharmaceutical substances
CO2	Understand the concept of pharmaceutical aids
CO3	Learn about various types of anti-oxidants and compounds that are used as Them
CO4	Illustrate about the effects and precautions to be taken while using the radio active agents

Course with focus on employability / entrepreneurship / Skill Developmentmodules

Skill Development		Employability		Entrepreneurship	
--------------------------	--	----------------------	--	-------------------------	--

Syllabus:

UNIT I

Impurities in pharmaceutical substances: Impurities commonly found in medicinal preparations. Sources of impurities in pharmaceutical chemicals, effect of impurities on pharmaceutical preparations. Permissible impurities in pharmaceutical Substances. Methods used to purify inorganic substances. Principle and method involved in the limit test for Chlorides, Sulphate, Iron, Lead.

UNIT II

Pharmaceutical aids: definition and classification-Role of different pharmaceutical aids (acidifiers, alkalizing agents, buffers, anti-oxidants and preservatives, desiccants, emulsifiers, coloring, flavoring, and sweetening agents, solvents) in pharmaceutical preparations.

Unit III

Antioxidants: Definition, criteria for a substance to act as antioxidant. Compounds used as antioxidants (Sodium metabisulphite, Nitrogen, Sodium thiosulphate, sodium bisulphite, sodium nitride) and their uses.

Gastrointestinal agents: Definition, examples. Acidifying reagents or Acidifiers and their types. Antacids- Definition, antacid therapy, role and criteria and side effects of antacids, examples of compounds used as antacids
Cathartics, purgatives and laxatives: Definition and examples.

Unit IV

Radio pharmaceuticals: Radio activity, radioactive rays (Alfa, beta and gamma rays), isotopes definition and examples, units of radioactivity, biological effects of radiation, precautions to be taken while handling and storage of radioactive isotopes, applications of radioactive in research, diagnosis and medicines.

Water: Water as universal pharmaceutical vehicle. Water: official water (water, purified water, water of injection, bacteriostatic water for injection, sterile water for injection).

Textbooks:

1. Pharmaceutical inorganic chemistry by Kaza somasekhara Rao, Ch. Venkata Suresh.
2. Pharmaceutical inorganic chemistry by G.R. Chatwal.

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

P01 : Knowledge in Pharmaceutical Chemistry : Apply the knowledge of different dosage forms and their routes of administration.

P02: Problem analysis: Identify, formulate, review research literature, and analyze simple to complex problems reaching substantiated conclusions using fundamental principles of pharmaceutical chemistry.

P03: Design/development of solutions: Design solutions for simple to complex problems and designing novel routes for the synthesis of bioactive / active pharmaceutical ingredients.

P04: 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.

P05 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for drug modeling and interpretation of simple to complex drug molecules.

P06 : Society: Applying the contextual knowledge to assess societal, health, safety, legal issues.

P07: 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.

P08 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmaceutical manufacturing practice.

P09 : Communication: Communicate effectively on issues related to pharmaceutical chemistry with the medical community, being able to write the effective reports and documentations and presentations.

P010: 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

P.R.GOVERNMENT COLLEGE(A),KAKINADA

B.Voc(PHARMACEUTICAL

CHEMISTRY) V / VI SEMESTER

Course-10: PHARMACEUTICAL INORGANIC CHEMISTRY

WEIGHTAGE TO CONTENT

S No	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	2	2	30	Understanding, Skill
2.	UNIT-II	2	2	30	Remembering, Understanding
3.	UNIT-III	2	2	30	Remembering, Knowledge
4.	UNIT-IV	2	2	30	Evaluating, understanding
	Total	8	8	120	

MODEL QUESTION PAPER

Time 2hrs.30min

Max.Marks-60

SECTION-A

Answer any THREE questions choosing at least ONE question from each section

4x10=40M

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

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-II
11. One question is to be set from unit-III
12. One question is to be set from unit-III
13. One question is to be set from unit-IV

**P.R.GOVERNMENT COLLEGE (A), KAKINADA
B.Voc (PHARMACEUTICAL CHEMISTRY)
THIRD YEAR SEMESTER-V/VI**

**Course 10: PHARMACEUTICAL INORGANIC CHEMISTRY
Question bank**

Essay questions (10M)

Unit-I

1. Explain different sources of impurities in medicinal preparations.
2. Explain different methods for the purification of inorganic substances.
3. Explain principle and method involved in the limit test for a) chloride b) iron.
4. Explain principle and method involved in the limit test for a) sulphate b) lead

Unit-II

1. Explain the role of acidifiers, buffers, and anti oxidants in pharmaceutical preparations.
2. Explain the role of preservatives, emulsifiers and solvents in pharmaceutical preparations.
3. Explain the role of coloring, flavoring, sweetening agents and desiccants in pharmaceutical preparations.

Unit-III

1. Define anti oxidants. Explain the uses of sodium thiosulphates sodium bisulphate and nitrogen as anti oxidants.
2. Define antacids. Explain the criteria, uses and side effects of antacids.
3. Define gastrointestinal agents. Explain different types of acidifiers with examples.

Unit-IV

1. Explain the precautions to be taken while handling radioactive materials.
2. Write the applications of radioactive isotopes in medicine and research.
3. Explain different types of water used in pharmaceutical preparations.

Short answer questions (5M)

Unit-I

1. Explain some common impurities found in medicinal preparation.
2. Write effect of impurity on pharmaceutical preparations.
3. Write some permissible impurities in pharmaceutical substances.

Unit-II


1. Define pharmaceutical aids and classify them.
2. Explain the role of preservatives in pharmaceutical preparations.
3. Explain the role of anti oxidants in pharmaceutical preparations.

Unit-III

1. Define anti oxidants and write the criteria for a substances to act as antioxidants.
2. Write the uses of sodium nitride as anti oxidant.
3. Define gastrointestinal agents give examples.
4. What is anti-acid therapy and give examples of anti-acids.


Unit-IV

1. Define isotopes and give examples write the units of radioactivity.
2. Write the biological effects of radiation.

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (V Semester)			
Course Code	TITLE OF THE COURSE PHARMACEUTICAL INORGANIC CHEMISTRY PRACTICAL				
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	fundamental knowledge about limit tests	-	-	30	4+1

PRACTICALS :

1. Limit tests for chlorides
2. Limit tests for sulphate
3. Limit test for iron
4. Limit tests for lead
5. Preparation of phosphate buffers

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE ADVANCED ANALYTICAL CHEMISTRY	I B. Voc., Pharmaceutical chemistry (V/ VI Semester)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites	fundamental knowledge about chromatography	60	10	30	4+1

Course Objectives:

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

- Understand the chromatography techniques.
- Understand the solvent extraction process.
- Understand the common separation techniques

Understanding the common separation techniques Course Outcomes:

On Completion of the course, the students will be able to	
CO1	Understand the concept of some common separation techniques
CO2	Learn about the principle and process involved in solvent extraction
CO3	Learn about the principles and development of chromatogram
CO4	Learn about the principles and applications of gas- liquid chromatography and high performance liquid chromatography.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
--------------------------	--	----------------------	--	-------------------------	--

Syllabus:

Unit – I:

Some common separation techniques: Principles and applications Crystallization, Filtration, Decantation, Sublimation, Evaporation, Simple distillation, Fractional distillation, Centrifugation

Unit – II:

Solvent Extraction- definition- principle and process – Nernst distribution law and its limitations- Types of solvent extraction- batch extraction and continuous extraction- applications of solvent extraction

Unit – III:

Chromatography- definition- classification –paper chromatography- principle and experimental details- R_f value definition and factors affecting R_f factor- development of chromatogram- ascending, descending, two dimensional and radial chromatography- applications of paper

chromatography.

Thin Layer chromatography- principle and experimental details- superiority of thin layer chromatography over paper chromatography- applications of thin layer chromatography.

Unit – IV:

Column chromatography- principle and experimental details- applications of column chromatography.

Gas- Liquid Chromatography: Principle, Experimental details, Instrumentation and applications.

High Performance Liquid Chromatography: Principle, Experimental details, Instrumentation and applications

Textbooks:

1. Analytical Chemistry by Skoog and Miller
2. A textbook of qualitative inorganic analysis by A.I. Vogel
3. Nanochemistry by Geoffrey Ozin and Andre Arsenault
4. Stereochemistry by D. Nasipuri
5. Organic Chemistry by Clayden

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

P01 : Knowledge in Pharmaceutical Chemistry : Apply the knowledge of different dosage forms and their routes of administration.

P02: Problem analysis: Identify, formulate, review research literature, and analyze simple to complex problems reaching substantiated conclusions using fundamental principles of pharmaceutical chemistry.

P03: Design/development of solutions: Design solutions for simple to complex problems and designing novel routes for the synthesis of bioactive / active pharmaceutical ingredients.

P04: 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.

P05 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for drug modeling and interpretation of simple to complex drug molecules.

P06 : Society: Applying the contextual knowledge to assess societal, health, safety, legal issues.

P07: 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.

P08 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmaceutical manufacturing practice.

P09 : Communication: Communicate effectively on issues related to pharmaceutical chemistry with the medical community, being able to write the effective reports and documentations and presentations.

P010: 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

P.R.GOVERNMENT COLLEGE(A),KAKINADA

B.Voc(PHARMACEUTICAL

CHEMISTRY) V / VI SEMESTER

Course-11: ADVANCED ANALYTICAL CHEMISTRY

WEIGHTAGE TO CONTENT

S No	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	2	2	30	Understanding, Skill
2.	UNIT-II	2	2	30	Remembering, Understanding
3.	UNIT-III	2	2	30	Remembering, Knowledge
4.	UNIT-IV	2	2	30	Evaluating, understanding
	Total	8	8	120	

MODEL QUESTION PAPER

Time 2hrs.30min

Maxmarks-60

SECTION-A

Answer the following questions

4x10=40 M

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

Or

One question is to be set from unit-I

2. One question is to be set from unit-IIOr

One question is to be set from unit-II

3. One question is to be set from unit-IIIOr

One question is to be set from unit-III

4. One question is to be set from unit-IVOr

One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

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

QUESTION BANK
ESSAY QUESTIONS (10 MARKS)

Unit – I:

1. Write the principle and application of simple distillation
2. Write the principle and application of fractional distillation.
3. Write the principles and applications of crystallization.

Unit – II:

1. Explain Nernst distribution law with limitations.
2. What are types of solvent extraction? Explain in detail.

Unit – III:

1. Explain the principle and experimental details of paper chromatography.
2. Write the classification of paper chromatography.
3. Explain the principle and experimental details of thin layer chromatography.

Unit – IV:

1. Explain the principle and experimental details of column chromatography.
2. Explain the principle and experimental details of gas-liquid chromatography.
3. Explain the principle and experimental details of high performance liquid chromatography.

Short answer questions (5M)

Unit-I:

1. Write the principle of centrifugation.
2. What are applications of sublimation?
3. What are applications of filtration?

Unit – II


1. Write the principle of solvent extraction with examples.
2. Write the applications of solvent extraction.

Unit – III:

1. Define R_f value. What factors affecting R_f value?
2. Explain the superiority of thin layer chromatography over paper chromatography.
3. Write the applications of paper chromatography.
4. Write the applications of thin layer chromatography


Unit – IV:

1. Write the applications of column chromatography.
2. Write the applications of gas-liquid chromatography.
3. Write the instrumentation of gas-liquid chromatography.
4. Write the instrumentation of high performance liquid chromatography.
5. Write the applications of high performance liquid chromatography.

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (V/ VI Semester)			
Course Code	TITLE OF THE COURSE ADVANCED ANALYTICAL CHEMISTRY PRACTICAL				
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	fundamental knowledge on different conventional dosage forms.	-	-	30	4+1

PRACTICALS:

- 1.Determination of viscosity of organic compound.1
- 2.Determine the surface tension of organic compound.1
3. determination of rf values of amino acid using paper chromatography
4. determination of rf value of amino acid using thin layer chromatography

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (V /VI Semester)			
Course Code	TITLE OF THE COURSE BASIC QUALITY CONTROL AND QUALITY ASSURANCE				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites	fundamental knowledge about QA and QC	60	10	30	4+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

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
--------------------------	--	----------------------	--	-------------------------	--

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

Over view of Production Process for Life Sciences Industry

Fundamental science of API Production API Definition-Role of APIs – Top API Manufactures Need for conversation 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

Textbooks:

1. Lachman L., Liberman H.A., and Kanig J.L., Theory and Practice of Industrial Pharmacy Lea &Febiger, USA., latest edition.
2. Sambhamurthy, Pharmaceutical Engineering, New Age Publishers, latest edition.
3. Sethi PD. Quantitative analysis of drugs in pharmaceutical formulations,3rd ed., CBS publications, New Delhi, 2008
4. Text book of Pharmaceutics-I & II by A.K.Gupta
5. Indian Pharmacopieia -2014 (or latest Edition)
6. Pharmaceutical Drug Analysis-Kar, Ashutosh

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/conclus

P.R.GOVERNMENT COLLEGE(A),KAKINADA

B.Voc(PHARMACEUTICAL

CHEMISTRY) V /VI SEMESTER

Course-12: BASIC QUALITY CONTROL AND QUALITY ASSURANCE

WEIGHTAGE TO CONTENT

S No	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	2	2	30	Understanding, Skill
2.	UNIT-II	2	2	30	Remembering, Understanding
3.	UNIT-III	2	2	30	Remembering, Knowledge
4.	UNIT-IV	2	2	30	Evaluating, understanding
	Total	8	8	120	

MODEL QUESTION PAPER

Time 2hrs.30min

Maxmarks-60

SECTION-A

Answer the following questions

4x10=40 M

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

Or

One question is to be set from unit-I

2. One question is to be set from unit-IIOr

One question is to be set from unit-II

3. One question is to be set from unit-IIIOr

One question is to be set from unit-III

4. One question is to be set from unit-IVOr

One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

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

QUESTION BANK

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.

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

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE BASIC QUALITY CONTROL AND QUALITY ASSURANCE PRACTICAL	I B. Voc., Pharmaceutical chemistry (V/VI Semester)			
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	fundamental knowledge about QA and QC	-	-	30	4+1

PRACTICALS

1. Determination of alkalinity of water.
2. Determination of acidity of water.
3. Determination of hardness of water.
4. Determination of free chloride in water.
5. Determination of PH of water.

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE DOCUMENTATION FOR QUALITY CONTROL	I B. Voc., Pharmaceutical chemistry (V/VI Semester)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites	fundamental knowledge on different conventional dosage forms.	60	10	30	4+1

Course Objectives:

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

1. understand the Quality management system.
2. appreciate the importance of documentation
3. understand the advance R& D approaches

Course Outcomes:

On Completion of the course, the students will be able to	
CO1	Understand the concept of validation and qualification
CO2	Understand the concept of quality management system
CO3	Learn the rules and regulations for documentation in pharma industry as a part of quality control
CO4	Learn about the fundamentals of R&D

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
--------------------------	--	----------------------	--	-------------------------	--

Syllabus:

Unit -I validation

What is validation?- Validation versus Qualification- what has to be validated- phases of validation

-validation time line-DQ,IQ-OQ-PQ-OQ-validation report-setting the specification in DQ –

Installation qualification (IQ) and operational qualification (OQ)-on going performance (PQ)-

Operating instruments like stability chambers- BOD incubators-stability programme for validation

Page | 77

Unit –II Quality Management System (OOS, OOT)

Definition-QbD system-Need for QbD-handling of market complaints-correction actions- deviations and incidents-reporting, investigation and disposition of incidents,CAPA definition- flow chart of QA

Unit –III Documentation practices

Ten commandments of cGMP-cGMP enforcement and Guidelines-Code of Federal Regulation (CFR-210 & 211)- Audit & Self inspection-Quality audit-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

Unit –IV Fundamentals of Advance R&D approaches

Method Transfer Process and how to manage the Quality Risk-Quality Risk Management (QRM)- Responding to an Audit/Process related Query-Change Management

Textbooks:

1. Lachman L., Liberman H.A., and Kanig J.L., Theory and Practice of Industrial Pharmacy Lea &Febiger, USA., latest edition.
2. Sambhamurthy, Pharmaceutical Engineering, New Age Publishers, latest edition.
3. Sethi PD. Quantitative analysis of drugs in pharmaceutical formulations, 3rd ed., CBS publications, New Delhi, 2008
4. Text book of Pharmaceutics-I & II by A.K.Gupta
5. Indian Pharmacopoeia -2014 (or latest Edition)
6. Pharmaceutical Drug Analysis-Kar, Ashutosh

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

P01 : Knowledge in Pharmaceutical Chemistry : Apply the knowledge of different dosage forms and their routes of administration.

P02: Problem analysis: Identify, formulate, review research literature, and analyze simple to complex problems reaching substantiated conclusions using fundamental principles of pharmaceutical chemistry.

P03: Design/development of solutions: Design solutions for simple to complex problems and designing novel routes for the synthesis of bioactive / active pharmaceutical ingredients.

P04: 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.

P05 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for drug modeling and interpretation of simple to complex drug molecules.

P06 : Society: Applying the contextual knowledge to assess societal, health, safety, legal issues.

P07: 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.

P08 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmaceutical manufacturing practice.

P09 : Communication: Communicate effectively on issues related to pharmaceutical chemistry with the medical community, being able to write the effective reports and documentations and presentations.

P010: 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

P.R.GOVERNMENT COLLEGE(A),KAKINADA

**B.Voc(PHARMACEUTICAL
CHEMISTRY) V/VI SEMESTER**

Course-13: DOCUMENTATION FOR QUALITY CONTROL

WEIGHTAGE TO CONTENT

S No	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	2	2	30	Understanding, Skill
2.	UNIT-II	2	2	30	Remembering, Understanding
3.	UNIT-III	2	2	30	Remembering, Knowledge
4.	UNIT-IV	2	2	30	Evaluating, understanding
	Total	8	8	120	

MODEL QUESTION PAPER

Time 2hrs.30min

Maxmarks-60

SECTION-A

Answer the following questions

4x10=40 M

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

Or

One question is to be set from unit-I

2. One question is to be set from unit-IIOr

One question is to be set from unit-II

3. One question is to be set from unit-IIIOr

One question is to be set from unit-III

4. One question is to be set from unit-IVOr

One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

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

QUESTION BANK

UNIT I

1. Define validation; write its importance and types. Write about validation master plan
2. Explain the validation protocol for cleaning process
3. How to perform Analytical method validation

UNIT-II

1. What are the salient features of CAPA
2. Explain different types of documents.
3. What are incidents? Explain reporting, investigation and disposition of incidents.

UNIT-III

1. Enumerate 10 principles of cGMP
2. What are Standard Operating Procedures (SOP)
3. What do you understand by master formula record. Write a brief note.

UNIT-IV

1. Explain quality risk management system.
2. What is method transfer process. Write the process related query.

SHORT ANSWER TYPE QUESTIONS (5M)

UNIT-I

1. Write about validation master plan
2. Validation timeline for DQ and IQ.
3. What are phases of validation?

UNIT-II


1. Write a short note on batch record documentation.
2. Define CAPA. Explain flowchart of QA.
3. Define QbD. Explain the need of QbD.

UNIT-III

1. Write about GdP.
2. Explain importance of documentation in Pharmaceutical industries.
3. Explain quality audit.


UNIT-IV

1. Write a short note on complaint files.
2. Write a short note on log books.

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (V / VI Semester)			
Course Code	TITLE OF THE COURSE DOCUMENTATION FOR QUALITY CONTROL PRACTICAL				
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	fundamental knowledge on different conventional dosage forms.	-	-	30	4+1

PRACTICALS

1. Preparation of aspirin.
2. Preparation of benzanilide.
3. Preparation of salicylic acid.
4. Preparation of 2, 4, 6 tri bromo phenol.
5. Preparation of beta Naphthol azo dye.

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE PHARMACEUTICAL AND MEDICINAL CHEMISTRY	I B. Voc., Pharmaceutical chemistry (V/VI Semester)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites	fundamental knowledge about various drugs	60	10	30	4+1

Course Objectives:

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

1. Understand the Pharma dynamics of a drug.
2. learn terminology of drugs.
3. learn HIV therapeutic drugs.

Course Outcomes:

On Completion of the course, the students will be able to	
CO1	Learn about pharmaceutical chemistry and its terminology
CO2	Understand the concept of pharmacodynamics and pharmacokinetics
CO3	Learn about the classification of drugs based on the structure and therapeutic Activity
CO4	Illustrate the mechanism of AIDS and the drugs available for the prevention

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
-------------------	--	---------------	--	------------------	--

Syllabus:

UNIT-I

Pharmaceutical chemistry Terminology: Pharmacy, Pharmacology, Pharmacophore, Pharmacodynamics, Pharmacokinetics (ADME, Receptors - brief treatment) Metabolites and Antimetabolites.

UNIT-II

Drugs:

Nomenclature: Chemical name, Generic name and trade names with examples

Classification: Classification based on structures and therapeutic activity with one example each.

Dosage forms: need for conversion drugs into medicines, different types of dosage forms based on physical state, Route of administration

UNIT-III

Synthesis and therapeutic activity of the compounds:

a. Chemo therapeutic Drugs

1. Sulphadruugs (Sulphamethoxazole) 2. Antibiotics - β -Lactam Antibiotics, Macrolide Antibiotics, 3. Anti malarial Drugs (chloroquine)

b. Psycho therapeutic Drugs:

1. Anti pyretics (Paracetamol) 2. Hypnotics, 3. Tranquilizers (Diazepam) 4. Levodopa
2. Anti viral drugs (acyclovir)

UNIT-IV

Pharmacodynamic Drugs:

1. Antiasthma Drugs (Solbutamol) 3. Antianginals (Glycerol Trinitrate)

4. Diuretics (Frusemide) HIV-AIDS

Immunity - CD-4 cells, CD-8 cells, Retro virus, Replication in human body, Investigation available, prevention of AIDS, Drugs available - examples with structures: PIS: Indinavir (Crixivan), Nelfinavir (Viracept)

Textbooks:

1. Medicinal Chemistry by Dr. B.V. Ramana
2. Synthetic Drugs by O.D. Tyagi & M. Yadav
3. Medicinal Chemistry by Ashutoshkar
4. Medicinal Chemistry by P. Parimoo
5. Pharmacology & Pharmacotherapeutics R.S. Satoshkar & S.D. Bhandenkar
6. Medicinal Chemistry by Kadametal P-I & P-II

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

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

P.R.GOVERNMENT COLLEGE(A),KAKINADA

**B.Voc(PHARMACEUTICAL
CHEMISTRY) V/VI SEMESTER**

Course-14: PHARMACEUTICAL AND MEDICINAL CHEMISTRY

WEIGHTAGE TO CONTENT

S No	Course Content	Essay (10M)	Short (5M)	Total marks	Question Relates as per Bloom's Taxonomy
1.	UNIT-I	2	2	30	Understanding. Skill
2.	UNIT-II	2	2	30	Remembering, Understanding
3.	UNIT-III	2	2	30	Remembering, Knowledge
4.	UNIT-IV	2	2	30	Evaluating, understanding
	Total	8	8	120	

MODEL QUESTION PAPER

Time 2hrs.30min

Maxmarks-60

SECTION-A

Answer the following questions

4x10=40 M

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

Or

One question is to be set from unit-I

2. One question is to be set from unit-IIOr

One question is to be set from unit-II

3. One question is to be set from unit-IIIOr

One question is to be set from unit-III

4. One question is to be set from unit-IVOr

One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

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

QUESTIONBANK
(Essayquestions10marks)

UNIT-I

1. Explain metabolites and anti metabolites with an example each
2. Explain ADME in pharmacokinetics.

Unit-II

1. Explain the classification of drugs based on structure.
2. Explain the classification of drugs based on therapeutic activity.

UNIT-III

1. Write the synthesis and therapeutic activity sulphamethoxazole
2. Write the synthesis and therapeutic activity chloroquine
3. Write the synthesis and therapeutic activity paracetamol
4. Write the synthesis and therapeutic activity diazepam

UNIT-IV

1. Write the synthesis and therapeutic activity solbutamol
2. Write the synthesis and therapeutic activity glycerol trinitrate.
3. Write the synthesis and therapeutic activity frusemide.
4. Explain CD-4cells and CD-8cells.

Short answer questions(5M)

UNIT-I

1. Explain the terms pharmacy and pharmacology.
2. Explain Pharmacophore with two examples.

Unit-II

3. Explain chemical name generic name and trade name with examples.
4. Write different types of dosage forms based on a) physical state b) route of administration


UNIT-III

1. Write sort note on anti biotics

2. Write short notes on anti pyretics
3. What are hypnotics and tranquilizers give examples

UNIT-IV

1. Write about methods of prevention of AIDS.
2. Write the structures of drugs a) indinavir b) Nelfinavir.

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	Program & Semester I B. Voc., Pharmaceutical chemistry (V /VI Semester)			
Course Code	TITLE OF THE COURSE PHARMACEUTICAL AND MEDICINAL CHEMISTRY PRACTICAL				
Teaching	Hours Allocated: 30 (Practical)	L	T	P	C
Pre-requisites	fundamental knowledge about various drugs	-	-	30	4+1

PROJECT WORK -50 MARKS