

17
**P.R.Government College(Autonomous)
Kakinada**

(Affiliated to AdikaviNannaya University)



Department of Chemistry

B.Voc(Pharmaceutical Chemistry)

Under NSQF Scheme

Board of studies

2021-22

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Note: BOS is to provide final soft copy in PDF and word formats and four copies of hard copies in bounded form to the office of Dean Academic affairs.

**P.R.Government College(Autonomous),KakinadaRe
commendedCompositionoftheBoardofStudiesofB.Voc
(PharmaceuticalChemistry)
Andit'sFunctionsofanAutonomousC
ollege2021-22**

Composition

1.Chairman,BoardofStudies:

Sri T.V.V.SatyaNarayanaM.Sc.,

NodalOfficerforB.Voc.(PharmaceuticalChemistry)

2.Theentirefacultyofeachspecialization.

- 1. Dr.D.Rama Rao**
- 2. Dr. D. Chenna Rao**
- 3. V. Sanjeev Kumar**
- 4. P. Vijay Kumar**
- 5. V.RamaBabu**
- 6. N.BujjiBabu**
- 7. T.UmaMaheswara Rao**
- 8. Dr.A.ChandraLeela**
- 9. Dr.Ch.Praveen**

3.SubjectexpertsfromoutsidethecollegetobenominatedbytheAcademicCouncil

**SriV.MallikharjunaSharma, LecturerinChemistry, ASD women
Govt.College(A),Kakinada**

Dr.k. Jhansi, LecturerinChemistry.

4.OneexperttobenominatedbytheVice-Chancellorfromapanelofsix

**RecommendedbytheCollegePrincipal,
Prof.K.Deepthi, AdikaviNannayaUniversity, Rajamundry.**

5.Expertfromindustry

- 1 Ch.S.N.Murthy, Director, Venky pharma pvt.Ltd, Yanam.**

6.One postgraduatemeritoriousalumnusnominatedbythePrincipal.

V.MallikarjunaSarma, M.Sc., OrganicChemistry

Signatures of the members who attended the Board of studies in B. Voc (Pharmaceutical Chemistry)

Date:10.12.2021 Time: 3.00 Pm

Mode of conduct of meeting: offline mode in P.R. Govt. College(A), Kakinada.

S.no	Name of the member	Designation	Signature
1	Sri. T. V. V. Satyanarayana	Chairman, Board of Studies, Nodal Officer for B. Voc (Pharmaceutical Chemistry)	T. V. V. Satyanarayana 10/12/2021
2	Prof. K. Deepthi	University Nominee Asst. Professor & Head of the Department of Chemistry, AKNU, Rajamundry.	K. Deepthi
3	Sri. K,anand	Subject Expert	K. Anand 10/11/21
4	DR.RAMESH BOGA	Founder & MD Boga R Laboratories, Peddapuram & Suvane, USA	
5	V. Mallikarjuna Sarma	Lecturer in Chemistry A.S.D Govt College Kakinada	V. Mallikarjuna Sarma 10/12/2021
7	Dr. D. Chenna Rao	Member Lecturer in chemistry Department of Chemistry	Dr. D. Chenna Rao 10/12/2021
8	V. Sanjeev Kumar	Member Lecturer in chemistry	V. Sanjeev Kumar
9	P. Vijay Kumar	Member Lecturer in Chemistry	P. Vijay Kumar
10	V. Rama Babu	Member Lecturer in Chemistry	V. Rama Babu
11	Student members: Hephshibah. K Mohan. Ph	Admn No:5215422 Admn No:5215420	Hephshibah. K Mohan. Ph

ACTION PLAN BOS MEETING-CHEMISTRY HELD ON 06-04-2021.

Department activities for the academic year 2020-2021.

Annexure I

1. Organizing National/State level seminars/Workshops/Conferences/Training programmes etc., with topics and other details.

(Mandatory for each Department)

- i) Staff development programme
- ii) Training in the use of HPLC
- iii) Awareness on OZONE protection
- iv) National Chemistry day
- v) Chem.fest
- vi) National Science day 2020
- vii) Guest lectures
- viii) Training in water analysis

2. Change of modules in the syllabus content.

Syllabus designed for first and second and final years as per university regulations. CBCS introduced for final year w.e.f. 2018-19 & CBCS introduced for I & II year w.e.f. 2020-21.

3. Plan for utilization of funds for Autonomous/UGC/other grants available for arranging guest lectures, faculty improvement programmes, study tours, equipping laboratories, reference books & other necessary teaching-learning material with ICT enabled teaching.

I. Study visits to:

Rs, 50,000

- 1. Hetero Laboratories, Nakkapally
- 2. Dr. Reddy's Laboratories, Yanam.
- 3. National Institute of Hydrology, Kakinada.
- 4. Nagarjuna Fertilizers and Chemicals Ltd, Kakinada.
- 5. Coromandel International Ltd., Kakinada
- 6. Venky Parenterals, Yanam

II.

1. Sophisticated version UV-Visible spectrophotometer-

5.0 lakhs

2. Other equipment

1.50 lakhs

3. Consumables

1.98 lakhs

4. Plan for organizing subject oriented community outreach programmes & allocation of necessary funds. (Mandatory for each Department)

- | | | | |
|-----|------------------------------|-----|--------|
| i) | Adoption of village | Rs. | 20,000 |
| ii) | Medical Awareness programmes | Rs. | 10,000 |

5. Institution of new medals/incentives/prizes etc., from alumni, philanthropists, parents, faculty etc., - Strategies to be recommended

6. Introduction of new Online programmes –PG/UG/Diploma and certificate courses.

Swayam online course

Industrial Pharmacy

7. Any other programme that enhance the learning capacity of students and their employable & knowledge skills.

Training in the use of instruments like AAS, UV-

Vis, HPLC, flame photometer, uranium analyzer, soil and water analysis projects, air quality projects.

8. Change in internal assessment exams for conducting Mid Semester by way of Project work/Assignment.

It is proposed to conduct an online Examination for Mid Semester Examination from 2020-21.

9. Suggest panel of examiners/papers setters & other experts/nominees for BOS deliberations.

Chemistry:

1. Dr. D. S. V. N. N. Rama Murthy, GDC(A), Tuni
2. Sri V. Sridhar, Arts College, Rajahmundry
3. Dr. B. Mallikarjuna, Arts College, Rajahmundry

Department of B.Voc (Pharmaceutical Chemistry) Board of Studies Meeting

Dt. 10-12-2021

Resolutions:

The meeting of Board of studies in B.Voc (Pharmaceutical Chemistry) is convened on 10-12-2021 at dept of chemistry in P.R. Govt. College (A). The Principal Dr. B.V. Tirupanyam, Dr. K. Deepthi, University Nominee, Sri K. Anand, GDC Pithapuram..., Subject 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 resolutions are 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 2020-21.
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 2020-21.
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. Resolved to implement pass minimum for internal assessment for CBSE pattern students as the pattern is learner oriented.
9. 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. 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 to get the 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 those prescribed for UG Courses by APSCHE, Vijayawada.
17. It is resolved to implement 50% external & 50% internal marks for both theory & practicals from the academic year 2020-2021 for first year students only.
18. It is resolved to implement 60% external & 40% internal marks for both theory & practicals from the academic year 2020-2021 for second & third year students
19. 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).
20. Resolve to conduct practical examinations semester wise.

The following paper setters are recommended

- i) Dr. D. S. V. N. N. Rama Murthy, GDC(A), Tuni
- ii) K. Anand, GDC Pithapuram.,
- iii) Sri V. Mallikarjuna Sarma, GDC(W), Kakinada

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 Vocation (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 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 within the undergraduate level of higher education in order to enhance employability of the graduates and meet industry requirements. Such graduates apart from meeting the need of local and national industry are also expected to be equipped to become part of the global workforce.
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 and its importance in organic chemistry
10. Acquire knowledge on the basic concepts of computers
11. Develop skills in MS Word, MS Excel and MS PowerPoint applications.
12. Develop communication and soft skills.

13. Undergo industrial training and acquire skills in various instrumentation techniques.
14. Visit pharmaceutical industries and understand the functioning of plant,

Course Outcomes:

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 roles 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.

Sem-I

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

**P.R.GOVERNMENT COLLEGE(A), KAKINADA DEPARTMENT OF CHEMISTRY
B.VOC(PHARMACEUTICAL CHEMISTRY)(MATHS STREAM) CURRICULAR FRAMEWORK (CREDIT STABLE)
SEMESTER - II**

Category	Subject/Paper	Course	Theory / Practical	No. of Hrs./ Week	No of credits	Evaluation	
						Internal	External TOTAL
First language	ENGLISH PRACTISE COURSE-II		Theory	4	3	50	50 100
Second Language	Telugu/Sanskrit/Hindi		Theory	4	3	50	50 100
Life Skill Courses	Information and Communication Technology		Theory	2	2	-	50 50
Skill Development Course-1	Food Adulteration		Theory	2	2	-	50 50
Skill Development Course-1	Dairy technology		Theory	2	2	-	50 50
Major Subject-1	Mathematics	C2	Theory	6	5	50	50 100
Major Subject-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	600 850

**P.R.GOVERNMENT COLLEGE(A),
KAKINADA DEPARTMENT OF CHEMISTRY
B.VOC(PHARMACEUTICAL CHEMISTRY)(MATHS STREAM) CU
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
	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) CURRICU
LAR FRAMEWORK (CREDIT TABLE)
Semester – IV**

Category	Subject/Paper	Course	Theory /Practical I	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 CURRICU-
LAR FRAMEWORK(CREDITTABLE)

Semester-V

Subject/Paper	Theory /Practical t	No of credit s	Evaluation
First Phase of Apprenticeship bet- ween 1 st and 2 nd year (Summer Vacation)		04	100
Second Phase of Apprenticeship be- tween 2 nd and 3 rd year (Summer Vacation)		04	100
INDUSTRIAL INTERNSHIP		12	300
TOTAL		20	400

**P.R.GOVERNMENT COLLEGE(A),
KAKINADA DEPARTMENT OF CHEMISTRY
B.VOC(PHARMACEUTICAL CHEMISTRY)(MATHS STREAM) CURRICU
LAR 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
	Pharma Regulatory Affairs		Practical	2	1		50
	Pharmaceutical Inorganic Chemistry	C10	Theory	4	4	40	60
	Pharmaceutical Inorganic Chemistry		Practical	2	1		50
	Advanced Analytical Chemistry	C11	Theory	4	4	40	60
	Advanced Analytical Chemistry		Practical	2	1		50
	Basic Quality Control and Quality Assurance	C12	Theory	4	4	40	60
	Basic Quality Control and Quality Assurance		Practical	2	1		50
	Documentation for Quality Control	C13	Theory	4	4	40	60
	Documentation for Quality Control		Practical	2	1		50
	Pharmaceutical and Medicinal Chemistry	C14	Theory	4	4	40	60
	Pharmaceutical and Medicinal Chemistry		Practical	2	1		50
			TOTAL	36	30	240	660
							900

**P.R.GOVERNMENTCOLLEGE(A),KAKINADADEPARTM
ENTOFCHEMISTRY**

**B.VOC(PHARMACEUTICALCHEMISTRY)(BIOLOGYSTREAM)CU
RICULARFRAMEWORK(CREDITSTABLE)**

SEMESTER-I

Category	Subject/Paper	Course	Theory /Practical	No. ofHr s./ 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
LifeSkillCourse	ComputerApplications		Theory	2	2	-	50 50
SkillDevelopment Course	Plantnursery		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	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	600 850

Category	Subject/Paper	Course	Theory /Practical I	No. ofHrs./ Week	No ofcredits	Evaluation		
						Internal	External	TOTAL
First language	ENGLISH PRAXIS COURSE-II		Theory	4	3	50	50	100
Second Language	Telugu/Sanskrit/Hindi		Theory	4	3	50	50	100
Life Skill Courses	Information and Communication Technology		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
Major Subject-1	Botany	C2	Theory	4	4	50	50	100
	Botany		Practical	2	1		50	50
Major Subject-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

Category	Subject/Paper	Course	Theory /Practical	No. ofHrs/ Week	No ofCredits	Evaluation		
						Internal	External	TOTAL
Firstlanguage	ENGLISHPRAXISCOURSE-III		Theory	4	3	40	60	100
SecondLanguage	Telugu/Sanskrit/Hindi		Theory	4	3	40	60	100
LifeSkillCourse-I	EnvironmentEducation		Theory	2	2	-	50	50
LifeSkillCourse-II	PersonalityDevelopmentand Leadership		Theory	2	2	-	50	50
SkillDevelopment Course	EnvironmentAudit		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
	AdvancedPharmaceutics-I	C5	Theory	4	4	40	60	100
	AdvancedPharmaceutics-I		Practical	2	1		50	50
Vocational	AdvancedPharmaceutics-II	C6	Theory	2	2	-	50	50
	AdvancedPharmaceutics-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)CU
RICULAR FRAMEWORK(CREDIT TABLE)
Semester-IV**

Category	Subject/Paper	Course	Theory /Practical I	No. of Hr s./ Week	No of credi ts	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),
KAKINADADEPARTMENT OF CHEMISTRY
B.VOC(PHARMACEUTICAL CHEMISTRY)(BIOLOGY STREAM)CU
RICULAR FRAMEWORK(CREDIT STABLE)

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) CU
RICULAR 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.GOVERNMENT COLLEGE(AUTONOMOUS)KAKINADA
CURRICULAR FRAMEWORK FOR B.VOC COURSE UNDER NSQF FOR THE YEAR 2020-21
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													
Major Subject-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+1				
	C1 to C5 Chemistry (Theory & Practicals)	4+2	4+1	4+2	4+1	4+2	4+1	4+2	4+1				
Vocational	C1 to C14 including SECP pharmaceutical Chemistry (Theory & Practicals)	4+2	4+1	4+2	4+1	4+2	4+1	4+2	4+1	4+2	4+1	4+2	4+1
	C2, C4, C6 (Theory and Lab/Institutional/Industrial Training Pharmaceutical Chemistry)	2+2	2+1	2+2	2+1	2+2	2+1	4+2	4+1	4+2	4+1	4+2	4+1
Total Hrs/Week (Academic Credits)		34	28	36	30	36	30	36	30	36	30	36	30
Extension Activities													
NCC/NSS/Sports/Extra Curricular													
Yoga							1						
Extra Credits													
Hrs/W (Total Credits)		34	28	36	30	36	31	36	33	36	30	12	4

Third Phase of Apprenticeship for the entire V/VI Semester
 and Second Phase (2 Spells) of Apprenticeship between I and II semester
 and between II and III year Summer Vacation

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	0/50	100	100/150	500/750
6	Core/SE-II Chemistry	5	4+2	4+1	25	40	60	0/50	100	100/150	750
7	Vocational Courses (C1 to C14) Pharmaceutical Chemistry	11	4+2	4+1	55	40	60	50	100	150	1650
							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.VOCCOURSES UNDER NSQF SCHEME

STUDENT ELIGIBILITY AND FACULTY ELIGIBILITY

S.NO	NAME OF THE COURSE	STUDENTS ELIGIBILITY (10+2 OR EQUIVALENT WITH SPECIFIC GROUP IF ANY)	FACULTY ELIGIBILITY WITH SPECIALIZATION
1	B.VOC (COMMERCIAL AQUACULTURE)	Intermediate/10+2 or equivalent with Bi.P.C/Biology	M.Sc Aquaculture/Marine Biology/Zoology with fishery biology spe
2	B.VOC (HORTICULTURE)	Intermediate/10+2 or equivalent with Bi.P.C/Biology	M.Sc Horticulture/Biology/Botany with Horticulture Specialization
3	B.VOC (PHARMACEUTICAL CHEMISTRY)	Intermediate or 10+2 with MPC/BiPC group	M.Pharm/M.Sc (Pharmaceutical Chemistry)/M.Sc (Chemistry)
4	B.VOC (FOOD TECHNOLOGY)	Intermediate or 10+2 with MPC/BiPC group	M.Sc (Food Technology)/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 Hotel Management/M.Comor MBA with Diploma in Hotel Management

QUESTIONPAPERSETTERSFORB.VOC(PHARMACEUTICALCHEMISTRY)

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

S. No.	Name of the Faculty	Designation	Address for Correspondence	Mobile Number	E-mail ID
1	Sri V. Sanjeev Kumar	Lecturer in Chemistry	P.R. Government Degree College, Kakinada, East Godavari District.	9849324966	skvudi1972@gmail.com
2	Malikarjuna Sarma	Lecturer in Chemistry	A.S.D. GOVERNMENT COLLEGE for women (A), Kakinada Kakinada, East Godavari District.	9676822550	V.mallikarjunasarma@gmail.com
3	Sri V. Sridhar	Lecturer in Chemistry	Government arts college (A), RAJAMUNDRY, East Godavari District	8919262964, 7386048119	sridhar.vegi07@gmail.com
4	Dr. B. Malikarjuna	Lecturer in Chemistry	Government College (Autonomous), Rajahmundry	8985503523	mallik.chem@gmail.com
5	Dr. G. Venkata Rao	Lecturer in Chemistry		9440444223	gnrgjcn@gmail.com
6	Sri B. Venkata Rao	Lecturer in Chemistry	Government arts college (A), RAJAMUNDRY, East Godavari District		venkatbasa@gmail.com
7	Smt. Manchiraju Padmaja	Lecturer in Chemistry	Government arts college (A), RAJAMUNDRY, East Godavari District	9441653995	padmaja717@gmail.com

P.R.GOVERNMENT COLLEGE(A), KAKINADA
B.Voc(PHARMACEUTICAL CHEMISTRY)T
HIRD YEAR SEMESTER-V
Course 9: PHARMA REGULATORY AFFAIRS

PAPER: PHARMA REGULATORY AFFAIRS

Course Scope:

To make the student

- i. Understand the different types of hazards
- ii. Understand the Good laboratory practices.
- iii. Understanding the investigation of new drug.

Learning Objectives:

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

1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
2. The regulatory authorities and agencies governing the manufacture and sale of Pharmaceuticals
3. Know different Acts that regulate pharmaceutical industry

UNIT: I

Good laboratory Practice, Standard operating procedure, Standard

Testing procedure, Certificate of Analysis, Method of Analysis, good receipt note. *responsibilities*
quality Audits

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. *clinical trials*

UNIT: III

GMP, ISO 9000, TQM, ICH. *(phases I, II, III, IV)*
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.

Reference Books:

1. J. A Dean, analytical chemistry handbook, McGraw Hill Inc., 1st Ed., 1995.
2. Ethical Guidelines for Biomedical research on human subjects 2000. Indian Council of Medical

Research, New Delhi.

3. Goodman & Gilman: JG Hardman, LE Limbard, 10th Edn. McGraw Hill Publications, 2001.

4. Central Drugs Standard Control Organization. Good Clinical Practices - Guidelines for Clinical Trials

on pharmaceutical Products in India. New Delhi: Ministry of Health; 2001.

**P.R. GOVERNMENT COLLEGE (A), KAKINADA B.
Voc (PHARMACEUTICAL
CHEMISTRY) THIRD YEAR SEMESTER-V
Course 9: PHARMA REGULATORY AFFAIRS**

PAPER -: PHARMA REGULATORY AFFAIRS

WEIGHTAGE TO CONTENT

Sl.No.	Course Content	Essay (10M)	Short (5M)	Total marks
1.	UNIT-I	2	2	30
2.	UNIT-II	2	2	30
3.	UNIT-III	2	2	30
4.	UNIT-IV	2	2	30
	Total	8	8	120

P.R.GOVERNMENTCOLLEGE(A),KAKINADAB.
Voc (PHARMACEUTICAL
CHEMISTRY)THIRDYEARSEMESTER-V
Course9:PHARMAREGULATORYAFFAIRS

PAPER:-PHARMAREGULATORYAFFIARS

Time2hrs.30min

Maxmarks-60M

SECTION-A

Answerthefollowingquestions

4x10=40M

1. Onequestionistobesetfromunit-I

Or

Onequestionistobesetfromunit-I

2. Onequestionistobesetfromunit-IIOr

Onequestionistobesetfromunit-II

3. Onequestionistobesetfromunit-IIIOr

Onequestionistobesetfromunit-III

4. Onequestionistobesetfromunit-IVOr

Onequestionistobesetfromunit-IV

SECTION-B

AnsweranyFOURquestions

4x5=20M

5. Onequestionistobesetfromunit-I

6. Onequestionistobesetfromunit-I

7. Onequestionistobesetfromunit-II

8. Onequestionistobesetfromunit-II

9. Onequestionistobesetfromunit-III

10. Onequestionistobesetfromunit-III

11. Onequestionistobese!fromunit-IV

12. Onequestionistobesetfromunit-IV

P.R.GOVERNMENTCOLLEGE(A),KAKINADAB.
Voc (PHARMACEUTICAL
CHEMISTRY)THIRDYEARSEMESTER-V
Course9:PHARMAREGULATORYAFFAIRS

QUESTIONBANK(ESSAY
QUESTIONS)

UNIT-1

1. WriteanessayonGLP
2. Whyarethereservesamplesmaintained.
3. StatethecontentsofSOPonhandlingoftherejectingmaterial.

UNIT-II

1. WhatarethecontentofNDA.
2. WhatarethecontentofIND.
3. ExplainthesubmissionofIND.

UNIT-III

1. Whatisapatent?Describeimportanceofpatentinresearch
2. WhyprotectionisneededonIntellectualproperty

UNIT-IV

1. Writeanoteonfirstaid
2. Listoutthehazardouschemicalsinpharmaceuticals.
3. Describevariousafetyrulesatworkplace.

SHORTQUESTIONS

UNIT-I

1. WriteaboutcertificateofAnalysis
2. WritetheprinicplesofGLP
3. WriteaboutgeneratingSTP

UNIT-II

1. ExplainthecontentofinvestigatorBrochure.
2. Whatarethespecificrequirements,content&formatofNDA
3. WhatarethemanufacturingcontrolrequirementofNDA.

UNIT-III

1. DefineGMPprotocol
2. WriteanoteonUSFDA
3. WriteanoteonCDSCO

UNIT-IV

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

P.R.GOVERNMENTCOLLEGE(A),KAKINADAB.
Voc (PHARMACEUTICAL
CHEMISTRY)THIRDYEARSEMESTER-V
Course9:PHARMAREGULATORYAFFAIRS

PAPER:-PHARMAREGULATORYAFFAIRS

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 B.
Voc (PHARMACEUTICAL
CHEMISTRY) THIRD YEAR SEMESTER-V
Course 10:
PHARMACEUTICAL INORGANIC CHEMISTRY
PHARMACEUTICAL
INORGANIC CHEMISTRY

Course Scope:

To make the student

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

Learning Objectives:

Upon completion of the course, the students shall be able to understand: 1 To learn permissible impurities in pharmaceutical substances.

1. To learn role & criteria of antacids.

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.

quality control & test box purity

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 nitrite) 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

Radiopharmaceuticals: Radioactivity, radioactive rays (Alpha, 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 isotopes in research, diagnosis and medicines.

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

Reference Books:

1. Pharmaceutical inorganic chemistry by K. S. Somasekhara Rao, Ch. Venkata Suresh.
2. Pharmaceutical inorganic chemistry by G. R. Chatwal.

**P.R. GOVERNMENT COLLEGE (A), KAKINADA B.
Voc (PHARMACEUTICAL
CHEMISTRY) THIRD YEAR SEMESTER-V
Course 10: PHARMACEUTICAL INORGANIC CHEMISTRY**

WEIGHTAGE TO CONTENT

Sl.No.	Course Content	Essay (10M)	Short (5M)	Total marks
1.	UNIT-I	2	2	30
2.	UNIT-II	2	2	30
3.	UNIT-III	2	2	30
4.	UNIT-IV	2	2	30
	Total	8	8	120

P.R.GOVERNMENT COLLEGE(A), KAKINADA B.
Voc (PHARMACEUTICAL
CHEMISTRY) THIRD YEAR SEMESTER-V
Course 10: PHARMACEUTICAL INORGANIC CHEMISTRY

Time 2 hrs. 30 min

Max marks-60

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

P.R.GOVERNMENT COLLEGE(A), KAKINADA B.
Voc (PHARMACEUTICAL
CHEMISTRY) THIRD YEAR SEMESTER-V
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 antioxidants 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 antioxidants. Explain the uses of sodium thiosulphate and sodium bisulphate and nitrogen as antioxidants.
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 antioxidants in pharmaceutical preparations.

Unit-III

1. Define antioxidants and write the criteria for a substance to act as antioxidants.
2. Write the uses of sodium nitrite as antioxidant.
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 unit of radioactivity.
2. Write the biological effects of radiation.

P.R.GOVERNMENTCOLLEGE(A),KAKINADAB.
Voc (PHARMACEUTICAL
CHEMISTRY)THIRDYEARESEMESTER-V
Course10:PHARMACEUTICALINORGANICCHEMSTRY

PRACTICALS

LIMITTESTS:

- 1.Limittestforchloride.
- 2.Limittestforsulphate.
- 3.Limittestforiron.
- 4.Limittestforlead.

5 preparation of phosphate buffers

P.R.GOVERNMENT COLLEGE(A), KAKINADA B.
Voc (PHARMACEUTICAL
CHEMISTRY) THIRD YEAR SEMESTER-V
Course 11: ADVANCED ANALYTICAL CHEMISTRY

Course Scope:

To make the student

- i. Understand the chromatography techniques.
- ii. Understand the solvent extraction process.
- iii. Understanding the common separation techniques.

Learning Objectives:

Upon completion of the course, the students shall be able to understand: 1. To learn application of chromatography.
2. To learn application of solvent extraction process.

Unit-I:

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

Unit- II:

Solvent Extraction- definition- principle and process – Nernst distribution law and its limitations- Types of solvent extraction-
batch extraction and continuous extraction- application 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-
application of paper chromatography.

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

Unit-IV:

Column chromatography- principle and experimental details- *& instrumentation*
application of column chromatography.

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

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

List of Reference Books

1. Analytical Chemistry by Skoog and Miller
2. A text book 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

P.R. GOVERNMENT COLLEGE(A), KAKINADA B.
Voc (PHARMACEUTICAL
CHEMISTRY) THIRD YEAR SEMESTER-V
Course 11: ADVANCED ANALYTICAL CHEMISTRY

WEIGHTAGE TO CONTENT

Sl.No.	Course Content	Essay(10M)	Short(5M)	Total marks
1.	UNIT-I	2	2	30
2.	UNIT-II	2	2	30
3.	UNIT-III	2	2	30
4.	UNIT-IV	2	2	30
	Total	8	8	120

P.R.GOVERNMENT COLLEGE(A), KAKINADAB.
Voc (PHARMACEUTICAL
CHEMISTRY) THIRD YEAR SEMESTER-V
Course 11: ADVANCED ANALYTICAL CHEMISTRY

Time 2hrs.30min

Max marks-60

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

P.R.GOVERNMENTCOLLEGE(A),KAKINADAB.
Voc (PHARMACEUTICAL
CHEMISTRY)THIRDYEARSEMESTER-V
Course11:ADVANCEDANALYTICALCHEMISTRY

QUESTIONBANKESSA
YQUESTIONS(10M)

Unit-I:

1. Writetheprincipleandapplicationofsimpliedistillation
2. Writetheprincipleandapplicationoffractionaldistillation.
3. Writetheprinciplesandapplicationsofcrystallization.

Unit- II:

1. ExplainNernstdistributionlawwithlimitations.
2. Whatare types of solvent extraction? Explain in detail.

Unit-III:

1. Explaintheprincipleandexperimental detailsofpaperchromatography.
2. Writetheclassificationofpaperchromatography.
3. Explaintheprincipleandexperimental detailsofthinlayerchromatography.

Unit-IV:

1. Explaintheprincipleandexperimental detailsofcolumnchromatography.
2. Explaintheprincipleandexperimental detailsofgas-liquidchromatography:
3. Explain the principle and experimental details of high performance liquid chromatography.

Short answer questions(5M)

Unit-I:

1. Writetheprincipleofcentrifugation.
2. Whatare applicationsofsublimation?
3. Whatare applicationsoffiltration?

Unit- II

1. Writetheprincipleofsolvent extractionwithexamples.
2. Writetheapplicationsofsolvent 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. Writetheapplicationsofpaperchromatography.
4. Writetheapplicationsofthinlayerchromatography

Unit-IV:

1. Writetheapplicationsofcolumnchromatography.
2. Writetheapplicationsofgas-liquidchromatography.
3. Writetheinstrumentationofgas-liquidchromatography.
4. Writetheinstrumentationofhighperformanceliquidchromatography.
5. Writetheapplicationsofhighperformanceliquidchromatography.

P.R.GOVERNMENTCOLLEGE(A),KAKINADAB.
Voc (PHARMACEUTICAL
CHEMISTRY)THIRDYEARSEMESTER-V
Course11:ADVANCEDANALYTICALCHEMISTRY

PRACTICALS:

- 1..Determinetheviscosityoforganiccompound-1
- 2.Determinetheviscosityoforganiccompound-2
- 3Determinethesurfacetensionoforganiccompound-1 .
- 4.Determinethesurfacetensionoforganiccompound-2 .
5. Determination of R_f value of Aminoacids using Paper chromatography
6. Determination of Fe^{3+} by solvent extraction.
7. Determination of R_f value of Aminoacids using Thin Layer Chromatography

P.R.GOVERNMENTCOLLEGE(A),KAKINADAB.
Voc (PHARMACEUTICAL
CHEMISTRY)THIRDYEARSEMESTER-V
Course12:BASICQUALITYCONTROL&QUALITYASSURANCE

LearningObjective: Upon completion of the course students shall be able to:

1. Understand the cGMP aspects in pharmaceutical industry.
2. Appreciate the importance of documentation

Scope:

1. Scope of quality certifications applicable to pharmaceutical industries
2. Understand the responsibilities of QA&QC departments

Unit-I Basic 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.
personnel; responsibilities and training hygiene for sample storage

Unit-II Overview of Production Process for Life Sciences Industry

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

Unit-III Validation in Pharmaceuticals

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

Unit-IV Documentation practices

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

REFERENCEBOOKS:

1. LachmanL., LibermanH.A., and KanigJ.L., TheoryandPracticeofIndustrialPharmacyLea&Febiger, USA., latestedition.
2. Sambhamurthy, PharmaceuticalEngineering, NewAgePublishers, latestedition
3. SethiPD. Quantitativeanalysisofdrugsinpharmaceuticalformulations, 3rded., CBSpublications, NewDelhi, 2008
4. TextbookofPharmaceutics-I&IIbyA.K.Gupta
5. IndianPharmacopiea-2014(ortatestEdition)
6. PharmaceuticalDrugAnalysis-Kar, Ashutosh

P.R.GOVERNMENTCOLLEGE(A), KAKINADAB.
Voc (PHARMACEUTICAL
CHEMISTRY)THIRDYEARSEMESTER-V
Course12: BASICQUALITYCONTROL&QUALITYASSURANCE

WEIGHTAGETOCONTENT

Sl.No.	CourseContent	Essay(10M)	Short(5M)	Totalmarks
1.	UNIT-I	2	2	30
2.	UNIT-II	2	2	30
3.	UNIT-III	2	2	30
4.	UNIT-IV	2	2	30
	Total	8	8	120

P.R.GOVERNMENT COLLEGE(A), KAKINADA B.
Voc (PHARMACEUTICAL
CHEMISTRY) THIRD YEAR SEMESTER-V
Course 12: BASIC QUALITY CONTROL & QUALITY ASSURANCE

Time 2 hrs. 30 min

Max marks - 60

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

P.R.GOVERNMENT COLLEGE(A), KAKINADA B.
Voc (PHARMACEUTICAL
CHEMISTRY) THIRD YEAR SEMESTER-V
Course 12: BASIC QUALITY CONTROL & QUALITY ASSURANCE

Question
Bank (ESSAY QUESTI
ONS)

UNIT-I

1. What are the various sampling processes involved in pharmaceutical industry
2. Describe the sampling procedure for raw materials in pharmaceutical industry
3. 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. Describe the five steps in sampling procedure
3. 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. Give a short note - Batch record documentation

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.

P.R.GOVERNMENTCOLLEGE(A),KAKINADAB.
Voc (PHARMACEUTICAL
CHEMISTRY)THIRDYEARSEMESTER-V
Course12:BASICQUALITYCONTROL&QUALITYASSURANCE

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 B.
Voc (PHARMACEUTICAL CHEMISTRY) THIRD YEAR
AR SEMESTER - V
Course 13: DOCUMENTATION FOR QUALITY CONTROL

Learning Objective: Upon completion of the course students shall be able to: 1. understand the Quality management system.

2. appreciate the importance of documentation

Scope:

1. Scope of quality certifications applicable to pharmaceutical industries 2. understand the advanced R&D approaches

Unit-I validation

What is validation? - Validation versus Qualification - what has to be validated - phases of validation - validation timeline - DQ, IQ, OQ, PQ, OQ - validation report - setting the specification in DQ -

Installation qualification (IQ) and operational qualification (OQ) - ongoing performance (PQ) - Operating instruments like stability chambers - BOD incubators - stability programme for validation batches, commercial batches - cleaning validation.

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 - flowchart 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, EUROREX-4

Unit-IV Fundamentalsof 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

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Voc (PHARMACEUTICAL
CHEMISTRY) THIRD YEAR SEMESTER-V
Course 13: DOCUMENTATION FOR QUALITY CONTROL

WEIGHTAGE TO CONTENT

Sl.No.	Course Content	Essay(10M)	Short(5M)	Total marks
1.	UNIT-I	2	2	30
2.	UNIT-II	2	2	30
3.	UNIT-III	2	2	30
4.	UNIT-IV	2	2	30
	Total	8	8	120

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Voc (PHARMACEUTICAL
CHEMISTRY)THIRDYEARSEMESTER-V
Course13:DOCUMENTATIONFORQUALITYCONTROL

Time2hrs.30min

Maxmarks-60

SECTION-A

Answerthefollowingquestions

4x10=40M

1. Onequestionistobesetfromunit-I
Or
Onequestionistobesetfromunit-I
2. Onequestionistobesetfromunit-IIOr
Onequestionistobesetfromunit-II
3. Onequestionistobesetfromunit-IIIOr
Onequestionistobesetfromunit-III
4. Onequestionistobesetfromunit-IVOr
Onequestionistobesetfromunit-IV

SECTION-B

AnsweranyFOURquestions

4x5=20M

5. Onequestionistobesetfromunit-I
6. Onequestionistobesetfromunit-I
7. Onequestionistobesetfromunit-II
8. Onequestionistobesetfromunit-II
9. Onequestionistobesetfromunit-III
10. Onequestionistobesetfromunit-III
11. Onequestionistobesetfromunit-IV
12. Onequestionistobesetfromunit-IV

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Course13:DOCUMENTATIONFORQUALITYCONTROL

Question
Bank(ESSAYQUESTIONS)

UNIT-I

1. Define validation;write its importance and types.
Writeaboutvalidationmasterplan
2. Explainthevalidationprotocolforcleaningprocess
3. HowtoperformAnalyticalmethodvalidation

UNIT-II

1. WhatarethesalientfeaturesofCAPA
2. Explaindifferenttypesofdocuments.
3. Whatareincidents?Explainreporting,investigationanddepositionofincidents.

UNIT-III

1. Enumerate10principlesofcGMP
2. WhatareStandardOperatingProcedures(SOP)
3. Whatdoyouunderstandbymasterformularecord.Writeabriefnote.

UNIT-IV

1. Explainqualityriskmanagementsystem.
2. Whatismethodtransferprocess.Writetheprocessrelatedquery.

SHORTANSWERTYPEQUESTIONS(5M)

UNIT-I

1. Writeaboutvalidationmasterplan
2. ValidationtimelineforDQandIQ.
3. Whatarephasesofvalidation?

UNIT-II

1. Writeashortnoteonbatchrecorddocumentation.
2. DefineCAPA.ExplainflowchartofQA.
3. DefineQbD.ExplaintheneedofQbD.

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 logbooks.

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THIRDYEARESEMESTER-V
Course13:DOCUMENTATIONFORQUALITYCONTROL

PRACTICALS

1. Preparation of aspirin.
2. Preparation of benzanilide.
3. Preparation of salicylic acid.
4. Preparation of 2,4,6-tribromophenol.
5. Preparation of beta Naphthol azo dye.

P.R.GOVERNMENTCOLLEGE(A),KAKINADAB.
Voc (PHARMACEUTICAL
CHEMISTRY)THIRDYEARSEMESTER-V
Course14:PHARMACEUTICALANDMEDICINALCHEMISTRY

Scope:

1. Scopeoftherapeuticactivityofdrugs.
2. UnderstandthePharmadynamicsofadrug.

LearningObjective:Uponcompletionofthecoursestudentshallbeableto:

1. Tolearnterminologyofdrugs.
2. TolearnHIVtherapeuticdrugs.

UNIT-I

PharmaceuticalchemistryTerminology:Pharmacy,Pharmacology,Pharmacophore,P
harmacodynamics,Pharmacokinetics(ADME,Receptors-
brieftreatment)MetabolitesandAntimetabolites.

UNIT-II

Drugs:

Nomenclature:Chemicalname,GenericnameandtradenameswithexamplesClassificatio
n: Classification based on structures and therapeutic activity with oneexampleeach.

Dosage forms: need for conversion drugs into medicines, different types of
dosageformsbasedonphysicalstate,Routeofadmistration

UNIT-III

Synthesisandtherapeuticactivityofthecompounds:

- a. ChemotherapeuticDrugs
 1. Sulphadrugs(Sulphamethoxazole)2.Antibiotics- β -
LactamAntibiotics,MacrolideAntibiotics,3.AntimalarialDrugs(chloroquine)
- b. PsychotherapeuticDrugs:
 1. Antipyretics(Paracetamol)2.Hypnotics,3.Tranquilizers(Diazepam)4.Levodopa

UNIT-IV

PharmacodynamicDrugs:

1. AntiasthmaDrugs(Solbutamol)3.Antianginals(GlycerolTrinitrate)
- 4.Diuretics(Frusemide)

2. Antiviral (Acyclovir)

HIV-AIDS:

Immunity-CD-4cells,CD-

8cells,Retrovirus,Replicationinhumanbody,preventionofAIDS,Drugsavailable-exampleswithstructures;PIS:Indinavir,Nelfinavir(Viracept).

ListofReferenceBooks:

1.MedicinalChemistrybyDr.B.V.Ramana2.Syntheti

c Drugsby

O.D.Tyagi&M.Yadav3.MedicinalChemistrybyAshu

toshkar4.MedicinalChemistrybyP.Parimoo

5. Pharmacology&PharmacotherapeuticsR.S.Satoshkar&S.D.Bhandenkar6.M
edicinalChemistrybyKadametalP-I&P.II

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Voc (PHARMACEUTICAL

CHEMISTRY)THIRDYEARSEMESTER-V

Course14:PHARMACEUTICALANDMEDICINALCHEMISTRY

WEIGHTAGETOCONTENT

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P.R.GOVERNMENTCOLLEGE(A),KAKINADAB.
Voc (PHARMACEUTICAL
CHEMISTRY)THIRDYEARSSEMESTER-V
Course14:PHARMACEUTICALANDMEDICINALCHEMISTRY

Time2hrs.30min

Maxmarks-60

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SECTION-B

AnsweranyFOURquestions

4x5=20M

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6. Onequestionistobesetfromunit-I
7. Onequestionistobesetfromunit-II
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9. Onequestionistobesetfromunit-III
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12. Onequestionistobesetfromunit-IV

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Voc (PHARMACEUTICAL
CHEMISTRY) THIRD YEAR SEMESTER-V
Course 14: PHARMACEUTICAL AND MEDICINAL CHEMISTRY

Question bank Essay
questions (10M)

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

UNIT-IV

1. Write the synthesis and therapeutic activity of salbutamol
2. Write the synthesis and therapeutic activity of glycerol trinitrate.
3. Write the synthesis and therapeutic activity of frusemide.

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 short note on antibiotics

2. Write short notes on antipyretics
3. What are tranquilizers give examples

UNIT-IV

1. Write about methods of prevention of AIDS.
2. Write the structures of drugs a) indinavir b) Nelfinavir.
3. Explain CD-4 cells and CD-8 cells.

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Practicals

Projectwork-50marks