P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY
(AUTONOMOUS)
44/35-1, Prakruthi Nagar, Utukur, Kadapa – 516 003 A.P.
(Approved by AICTE & PCI, New Delhi and Affiliated to JNTUA, Ananthapuramu)
Recognized u/s 2(f) & 12(b) of the UGC Act, 1956, New Delhi. Accredited by NAAC.

PRRMCP R25 REGULATIONS

Academic Regulations Course Structure and Detailed Syllabi

Pharm.D

and

Pharm.D (*Postbaccalaureate*)

Pharm.D (Regular six year course)

and

Pharm.D (*Post baccalaureate*)
(Regular three year course)
(Applicable for the batches admitted from Academic Year 2025-26)

As per PCI and JNTUA Norms

Doctor of Pharmacy (Pharm.D) Syllabus

Academic Regulations 2025 for Pharm.D and Pharm.D (Post Baccalaureate) (Regular)
(Effective for the students admitted into I year from the Academic Year 2025-2026 onwards)

1. Award of Pharm.D Degree

A student will be declared eligible for the award of the Pharm. D. Degree if he/she fulfils the following academic regulations:

i. Duration of the course. –

a) Pharm.D: The duration of the course shall be six academic years (five years of study and one year of internship or residency) full time with each academic year spread over a period of not less than two hundred working days. The period of six years duration is divided into two phases –

Phase I – consisting of First, Second, Third, Fourth and Fifth academic year.

Phase II – consisting of internship or residency training during sixth year involving posting in speciality units. It is a phase of training wherein a student is exposed to actual pharmacy practice or clinical pharmacy services and acquires skill under supervision so that he or she may become capable of functioning independently.

b) Pursue the course of study for not less than SIX academic years and is not more than TWELVE years.

c)Students, who fail to fulfil all the academic requirements for the award of the degree within TWELVE academic years from the year of their admission, shall forfeit their seat in Pharm D. course and their admission is cancelled.

2. Award of the Pharm. D (Post Baccalaureate) Degree.

A student will be declared eligible for the award of the Pharm. D (Post Baccalaureate). Degree if he fulfils the following academic regulations:

a) Pharm.D. (Post Baccalaureate): The duration of the course shall be for three academic years (two years of study and one year internship or residency) full time with each academic year spread over a period of not less than two hundred working days. The period of three years duration is divided into two phases –

Phase I – consisting of First and Second academic year.

Phase II – consisting of Internship or residency training during third year involving posting in speciality units. It is a phase of training wherein a student is exposed to actual pharmacy practice or clinical pharmacy services, and acquires skill under supervision so that he or she may become capable of functioning independently.

b) Pursue the course of study for not less than THREE academic years and is not more than SIX years.

c) Students, who fail to fulfil all the academic requirements for the award of the degree within SIX academic years from the year of their admission, shall forfeit their seat in Pharm D (PB) course and their admission is cancelled.

d) To add prefix 'Dr.' before the name of the candidate while awarding the degree 'Doctor of Pharmacy' vide regulation 18 of the Pharm D regulation, 2008.

3. Minimum qualification for admission to. –

a) Pharm.D. Part-I Course – A pass in any of the following examinations –

(1) 10+2 examination with Physics and Chemistry as compulsory subjects along with one of the following subjects: Mathematics or Biology.

(2) A pass in D.Pharmacy course from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act.

(3) Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations. Provided that a student should complete the age of 17 years on or before 31st December of the year of admission to the course. Provided that there shall be reservation of seats for the students belonging to the Scheduled Castes, Scheduled Tribes and other Backward Classes in accordance with the instructions issued by the Central Government/State Government/Union Territory Administration as the case may be from time to time.

b) Pharm.D. (Post Baccalaureate) Course - A pass in B.Pharm from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act: Provided that there shall be reservation of seats for the students belonging to the Scheduled Castes, Scheduled Tribes and other Backward Classes in accordance with the instructions issued by the Central Government/State Government/Union Territory Administration as the case may be from time to time.

4. Course of study. –

The course of study for Pharm.D. shall include the subjects as given in the Tables below. The number of hours in a week, devoted to each subject for its teaching in theory, practical and tutorial shall not be less than that noted against it in columns (3), (4) and (5) below.

In Second year Pharm.D for the student benefit and future prospective included Communicative English and Computer Technology (Audit Course). Communication and computer skills are important for Case presentations, Journal club, Clerkship and Project works etc.

In fifth year Pharm.D included audit course is Medical and Scientific Writing helps to promote the principles of scientific writing and research work.

COURSE STRUCTURE

First Year:

S. No.	Subjects Codes	Name of Subject	No. of hours of Theory	No. of hours of Tutorial	No. of hours of Practical	Lab	S. No.	Subjects codes
(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)
1.1	25T00101	Human Anatomy and Physiology	3	1	3	✓	1.7	25T00107
1.2	25T00102	Pharmaceutics	2	1	3	✓	1.8	25T00108
1.3	25T00103	Medicinal Biochemistry	3	1	3	✓	1.9	25T00109
1.4	25T00104	Pharmaceutical Organic Chemistry	3	1	3	✓	2.0	25T00110
1.5	25T00105	Pharmaceutical Inorganic Chemistry	2	1	3	✓	2.1	25T00111
1.6	25T00106	Remedial Mathematics/ Biology **	3/3*	1	0/3*	✓*	2.2	25T00112*
		Total hours	**16**	**6**	**15/18***			
		Total hours/Week	**37/40***					

* For Biology

** For Candidates who have studied PCMB in 10+2 course are exempted.

Second Year:

S. No.	Subjects Codes	Name of Subject	No. of hours of Theory	No. of hours of Tutorial	No. of hours of Practical	Lab	S. No.	Subjects Codes
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**		**(7)**	**(8)**
2.1	25T00201	Pathophysiology	3	1	-	-		-
2.2	25T00202	Pharmaceutical Microbiology	3	1	3	✓	2.8	25T00207
2.3	25T00203	Pharmacognosy & Phytopharmaceuticals	3	1	3	✓	2.9	25T00208
2.4	25T00204	Pharmacology - I	3	1	-	-		-
2.5	25T00205	Community Pharmacy	2	1	-	-		-
2.6	25T00206	Pharmacotherapeutics-I	3	1	3	✓	2.10	25T00209
2.7	25T00210	Communicative English and Computer Technology (Audit Course)	2					
		Total Hours	**19**	**6**	**9**			
		Total hours/Week	**34**					

For Audit course there is no internal and external examination.

Third Year:

S. No.	Subjects Codes	Name of Subject	No. of hours of Theory	No. of hours of Tutorial	No. of hours of Practical	Lab	S. No.	Subjects Codes
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**		**(7)**	**(8)**
3.1	25T00301	Pharmacology-II	3	1	3	✓	3.7	25T00307
3.2	25T00302	Pharmaceutical Analysis	3	1	3	✓	3.8	25T00308
3.3	25T00303	Pharmacotherapeutics-II	3	1	3	✓	3.9	25T00309
3.4	25T00304	Pharmaceutical Jurisprudence	2	-	-	-		-
3.5	25T00305	Medicinal Chemistry	3	1	3	✓	4.0	25T00310
3.6	25T00306	Pharmaceutical Formulations	2	1	3	✓	4.1	25T00311
		Total hours	**16**	**5**	**15**			
		Total hours/Week	**36**					

Fourth Year:

S. No.	Subjects Codes	Name of Subject	No. of hours of Theory	No. of hours of Tutorial	No. of hours of Practical/ Hospital Posting	Lab	S. No.	Subjects Codes
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**		**(7)**	**(8)**
4.1	25T00401	Pharmacotherapeutics-III	3	1	3	✓	4.7	25T00407
4.2	25T00402	Hospital Pharmacy	2	1	3	✓	4.8	25T00408
4.3	25T00403	Clinical Pharmacy	3	1	3	✓	4.9	25T00409
4.4	25T00404	Biostatistics & Research Methodology	2	1	-	-		-
4.5	25T00405	Biopharmaceutics & Pharmacokinetics	3	1	3	✓	4.10	25T00410
4.6	25T00406	Clinical Toxicology	2	1	-	-		-
		Total hours	**15**	**6**	**12**			
		Total hours/Week	**33**					
For Pharm.D (Post Baccalaureate)								
4.11	25T00411	Pharmacotherapeutics I & II	3	1	3	✓	4.12	25T00412
		Total hours	**18**	**7**	**15**			
		Total hours/Week	**40**					

Fifth Year:

S. No.	Subjects Codes	Name of Subject	No. of hours of Theory	No. of hours of Seminar	No. of hours of Hospital posting*
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
5.1	25T00501	Clinical Research	3	1	-
5.2	25T00502	Pharmacoepidemiology and Pharmacoeconomics	3	1	-
5.3	25T00503	Clinical Pharmacokinetics & Pharmacotherapeutic Drug Monitoring	2	1	-
5.4	25T00504	Clerkship*	-	1	-
5.5	25T00505	Project work (Six Months)	-	-	20
5.6	25T00506	Medical and Scientific Writing (Audit Course)	2		
		Total hours	**8**	**4 = 32**	**20**

* Attending ward rounds on daily basis.

Note: The entire class work be spread for the entire Academic Year along with Project work and clerkship.

For Audit course there is no internal and external examination.

Note: A candidate is permitted to submit Project work on acquiring the credentials, by producing Online Certificate course (SWAYAM/NPTEL) or publishing their Research / Review work indexed in Scopus / Web of Science/ UGC Care list Journals.

Sixth Year:

Internship or residency training including postings in speciality units. Student should independently provide the clinical pharmacy services to the allotted wards.

(i) Six months in General Medicine department, and

(ii) Two months each in three other specialty departments

5. Syllabus. – The syllabus for each subject of study in the said Tables shall be as specified in **Appendix -A** to these regulations.

6. Examination. –

(1) Every year there shall be an examination to examine the students.

(2) Each examination may be held twice every year. The first examination in a year shall be the annual examination and the second examination shall be supplementary examination. Supplementary examination (advanced) may be conducted within three months after announcement of the regular examination results.

(3) The examinations shall be of written and practical (including oral nature) carrying maximum marks for each part of a subject as indicated in Table below:

T A B L E S

First Year examination:

S. No.	Name of Subject	Maximum marks for Theory			Maximum marks for Practicals		
		Examination	Sessional	Total	Examination	Sessional	Total
1.1	Human Anatomy and Physiology	70	30	100	70	30	100
1.2	Pharmaceutics	70	30	100	70	30	100
1.3	Medicinal Biochemistry	70	30	100	70	30	100
1.4	Pharmaceutical Organic Chemistry	70	30	100	70	30	100
1.5	Pharmaceutical Inorganic Chemistry	70	30	100	70	30	100
1.6	Remedial Mathematics/ Biology	70	30	100	70	30	100
				600			600 = **1200**

Second Year examination:

S. No	Name of Subject	Maximum marks for Theory			Maximum marks for Practicals		
		Examination	Sessional	Total	Examination	Sessional	Total
2.1	Pathophysiology	70	30		-	-	-
2.2	Pharmaceutical Microbiology	70	30	100	70	30	100
2.3	Pharmacognosy &Phytopharmaceuticals	70	30	100	70	30	100
2.4	Pharmacology - I	70	30	100	-	-	-
2.5	Community Pharmacy	70	30	100	-	-	-
2.6	Pharmacotherapeutics - I	70	30	100	70	30	100
2.7	Communicative English and Computer Technology (Audit Course)	-	-	-	-	-	-
				600			300 = **900**

For Audit course there is no internal and external examination.

Third Year examination:

S. No.	Name of Subject	Maximum marks for Theory			Maximum marks for Practicals		
		Examination	Sessional	Total	Examination	Sessional	Total
3.1	Pharmacology-II	70	30	100	70	30	100
3.2	Pharmaceutical Analysis	70	30	100	70	30	100
3.3	Pharmacotherapeutics-II	70	30	100	70	30	100
3.4	Pharmaceutical Jurisprudence	70	30	100	-	-	-
3.5	Medicinal Chemistry	70	30	100	70	30	100
3.6	Pharmaceutical Formulations	70	30	100	70	30	100
				600			500 = **1100**

Fourth Year examination:

S. No.	Name of Subject	Maximum marks for Theory			Maximum marks for Practicals		
		Examination	Sessional	Total	Examination	Sessional	Total
4.1	Pharmacotherapeutics-III	70	30	100	70	30	100
4.2	Hospital Pharmacy	70	30	100	70	30	100
4.3	Clinical Pharmacy	70	30	100	70	30	100
4.4	Biostatistics & Research Methodology	70	30	100	-	-	-
4.5	Biopharmaceutics & Pharmacokinetics	70	30	100	70	30	100
4.6	Clinical Toxicology	70	30	100	-	-	-
				600			500 = **1100**

Fifth Year examination:

S. No.	Name of Subject	Maximum marks for Theory			Maximum marks for Practicals		
		Examination	Sessional	Total	Examination	Sessional	Total
5.1	Clinical Research	70	30	100	-	-	-
5.2	Pharmacoepidemiology and Pharmacoeconomics	70	30	100	-	-	-
5.3	Clinical Pharmacokinetics & Pharmacotherapeutic Drug Monitoring	70	30	100	-	-	-
5.4	Clerkship*	-	-	-	70	30	100
5.5	Project work (Six Months)	-	-	-	100**	-	100
5.6	Medical and Scientific Writing (Audit Course)	-	-	-	-	-	-
				300			200 = **500**

**Attending ward rounds on daily basis.*
*** 30 marks – viva-voce (oral) & 70 marks – Thesis work*
For Audit course there is no internal and external examination.

7. Attendance requirements:

A student shall be eligible to appear for End examinations if he acquires a minimum of 80% of attendance in aggregate of all the subjects in a year.

7.1 Condonation of shortage of attendance in aggregate from 70% and above and below 80% in each year may be granted by the College Academic Committee, on medical grounds/valid reasons.

7.2 Shortage of Attendance below 70% in aggregate shall in NO case be condoned.

7.3 Students whose shortage of attendance is not condoned in any year are not eligible to take their end examination of that class and their registration shall stand cancelled.

7.4 A student will not be promoted to the next year unless he/she satisfies the attendance requirements of the present year, as applicable. They may seek readmission for that year when offered next.

7.5 A stipulated fee shall be payable towards condonation of shortage of attendance to the University.

8. Mode of examinations

(1) Theory examination shall be of three hours and practical examination shall be of four hours duration.

(2) A Student who fails in theory or practical examination of a subject shall re-appear both in theory and practical of the same subject.

(3) Practical examination shall also consist of a viva –voce (Oral) examination.

(4) Clerkship examination – Oral examination shall be conducted after the completion of clerkship of students. An external and an internal examiner will evaluate the student. Students may be asked to present the allotted medical cases followed by discussion. Students' capabilities in delivering clinical pharmacy services, pharmaceutical care planning and knowledge of therapeutics shall be assessed.

9. Award of sessional marks and maintenance of records. —

(1) A regular record of both theory and practical class work and examinations conducted in an institution imparting training for Pharm.D. or as the case may be, Pharm.D (Post Baccalaureate) course, shall be maintained for each student in the institution and 30 marks for each theory and 30 marks for each practical subject shall be allotted as sessional.

(2) There shall be at least three periodic sessional examinations during each academic year and the highest aggregate of any two performances shall form the basis of calculating sessional marks.

(3) The sessional marks in practicals shall be allotted on the following basis: -

(i) Actual performance in the sessional examination (20 marks);

(ii) Day to day assessment in the practical class work, promptness, viva-voce record maintenance, etc. (10 marks).

10. Minimum marks for passing examination:

A student shall not be declared to have passed examination unless he or she secures at least 50% marks in each of the subjects separately in the theory examinations, including sessional marks and at least 50% marks in each of the practical examinations including sessional marks. The students securing 60% marks or above in aggregate in all subjects at the Pharm. D or as the case may be, Pharm. D (Post Baccalaureate) course examination shall be declared to have passed in first class. Students securing 75% marks or above in aggregate in all subjects shall be declared to have passed with distinction provided the student completes the course in 6 years for Pharm. D and 3 Years for Pharm. D (Post baccalaureate). Pass class shall be awarded to such of the candidates who would have passed the examination in subsequent number of attempts after completion of 6/3 years of the course.

11. Eligibility for promotion to next year. -

All students who have appeared for all the subjects and passed the first year annual examination are eligible for promotion to the second year and, so on. However, failure in more than three subjects (excluding Remedial Mathematics/ Biology) including supplementary examinations shall debar him or her from promotion to the next year classes.

Note: At any time of the course study a student should not have failed in more than 3 subjects (excluding Remedial Mathematics/ Biology) to be eligible for promotion to next higher class.

12. Internship. —

(1) Internship is a phase of training wherein a student is expected to conduct actual practice of pharmacy and health care and acquires skills under the supervision so that he or she may become capable of functioning independently.

(2) Every student has to undergo one year internship as per PCI norms for Pharm D (Appendix B).

13. Certificate of passing examination. — Every student who has passed the examinations for the Pharm.D. (Doctor of Pharmacy) or Pharm.D. (Post Baccalaureate) (Doctor of Pharmacy) as the case may be, shall be granted a certificate by the examining authority.

14. Hospital posting. — Every student shall be posted in constituent hospital for a period of not less than fifty hours to be covered in not less than 200 working days in each of second, third & fourth year course. Each student shall submit report duly certified by the preceptor and duly attested by the Head of the Department or Institution as prescribed. In the fifth year, every student shall spend half a day in the morning hours attending ward rounds on daily basis as a part of clerkship. Theory teaching may be scheduled in the afternoon.

15. Project work. —

(1) To allow the student to develop data collection and reporting skills in the area of community, hospital and clinical pharmacy, a project work shall be carried out under the supervision of a teacher. The project topic must be approved by the Head of the Department or Head of the Institution. The same shall be announced to students within one month of commencement of the fifth year classes. Project work shall be presented in a written report and as a seminar at the end of the year. External and the internal examiners shall do the assessment of the project work.

(2) Project work shall comprise of objectives of the work, methodology, results, discussions and conclusions.

16. Objectives of project work. — The main objectives of the project work is to—

(i) Show the evidence of having made accurate description of published work of others and of having recorded the findings in an impartial manner; and

(ii) Develop the students in data collection, analysis and reporting and interpretation skills.

17. Methodology. — To complete the project work following methodology shall be adopted, namely:—

(i) Students shall work in groups of not less than two and not more than four under an authorised teacher;

(ii) Project topic shall be approved by the Head of the Department or Head of the Institution;

(iii) Project work chosen shall be related to the pharmacy practice in community, hospital and clinical setup. It shall be patient and treatment (Medicine) oriented, like drug utilisation reviews, pharmacoepidemiology, pharmacovigilance or Pharmacoeconomics;

(iv) Project work shall be approved by the institutional ethics committee;

(v) student shall present at least three seminars, one in the beginning, one at middle and one at the end of the project work; and

(vi) two-page write-up of the project indicating title, objectives, methodology anticipated benefits and references shall be submitted to the Head of the Department or Head of the Institution.

18. Reporting. —

(1) Student working on the project shall submit jointly to the Head of the Department or Head of the Institution a project report of about 40-50 pages. Project report should include a certificate issued by the authorised teacher, Head of the Department as well as by the Head of the Institution.

(2) Project report shall be computer typed in double space using Times Roman font on A4 paper. The title shall be in bold with font size 18, sub-tiles in bold with font size 14 and the text with font size 12. The cover page of the project report shall contain details about the name of the student and the name of the authorised teacher with font size 14.

(3) Submission of the project report shall be done at least one month prior to the commencement of annual or supplementary examination.

19. Evaluation. — The following methodology shall be adopted for evaluating the project work—

(i) Project work shall be evaluated by internal and external examiners.

(ii) Students shall be evaluated in groups for four hours (i.e., about half an hour for a group of four students).

(iii) Three seminars presented by students shall be evaluated for twenty marks each and the average of best two shall be forwarded to the university with marks of other subjects.

(iv) Evaluation shall be done on the following items:	Marks
a) Write up of the seminar	(7.5)
b) Presentation of work	(7.5)
c) Communication skills	(7.5)
d) Question and answer skills	(7.5)
Total	(30 marks)

(v) Final evaluation of project work shall be done on the following items:	Marks
a) Write up of the seminar	(17.5)
b) Presentation of work	(17.5)
c) Communication skills	(17.5)
d) Question and answer skills	(17.5)
Total	(70 marks)

Explanation. — For the purposes of differentiation in the evaluation in case of topic being the same for the group of students, the same shall be done based on item numbers b, c and d mentioned above.

P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY (AUTONOMOUS)

Pharm.D - VI

APPENDIX A
INTERNSHIP

1. SPECIFIC OBJECTIVES:

i) To provide patient care in cooperation with patients, prescribers, and other members of an interprofessional health care team based upon sound therapeutic principles and evidence-based data, taking into account relevant legal, ethical, social cultural, economic, and professional issues, emerging technologies, and evolving biomedical, pharmaceutical, social or behavioral or administrative, and clinical sciences that may impact therapeutic outcomes.

ii) To manage and use resources of the health care system, in cooperation with patients, prescribers, other health care providers, and administrative and supportive personnel, to promote health; to provide, assess, and coordinate safe, accurate, and time-sensitive medication distribution; and to improve therapeutic outcomes of medication use.

iii) To promote health improvement, wellness, and disease prevention in co-operation with patients, communities, at-risk population, and other members of an interprofessional team of health care providers.

iv) To demonstrate skills in monitoring of the National Health Programmes and schemes, oriented to provide preventive and promotive health care services to the community.

v) To develop leadership qualities to function effectively as a member of the health care team organised to deliver the health and family welfare services in existing socio-economic, political and cultural environment.

vi) To communicate effectively with patients and the community.

2. OTHER DETAILS:

i) All parts of the internship shall be done, as far as possible, in institutions in India. In case of any difficulties, the matter may be referred to the Pharmacy Council of India to be considered on merits.

ii) Where an intern is posted to district hospital for training, there shall be a committee consisting of representatives of the college or university, and the district hospital administration, who shall regulate the training of such trainee. For such trainee a certificate of satisfactory completion of training shall be obtained from the relevant administrative authorities which shall be countersigned by the Principal or Dean of College.

iii) Every candidate shall be required, after passing the final Pharm.D. or Pharm.D. (Post Baccalaureate) examination as the case may be to undergo compulsory rotational internship to the satisfaction of the College authorities and University concerned for a period of twelve months so as to be eligible for the award of the degree of Pharm.D. or Pharm.D. (Post Baccalaureate) as the case may be.

3. ASSESSMENT OF INTERNSHIP:

i) The intern shall maintain a record of work which is to be verified and certified by the preceptor (teacher practioner) under whom he works. Apart from scrutiny of the record of work, assessment and evaluation of training shall be undertaken by an objective approach using situation tests in knowledge, skills and attitude during and at the end of the training. Based on the record of work and date of evaluation, the Dean or Principal shall issue certificate of satisfactory completion of training, following which the university shall award the degree or declare him eligible for it.

ii) Satisfactory completion of internship shall be determined on the basis of the following: -

(1) Proficiency of knowledge required for each case management. SCORE 0-5

(2) The competency in skills expected for providing Clinical Pharmacy Services. SCORE 0-5

(3) Responsibility, punctuality, work up of case, involvement in patient care. SCORE 0-5

(4) Ability to work in a team (Behavior with other healthcare professionals including medical doctors, nursing staff and colleagues). SCORE 0-5

(5) Initiative, participation in discussions, research aptitude. SCORE 0-5

Poor	Fair	Below Average	Average	Above Average	Excellent
0	1	2	3	4	5

A Score of less than 3 in any of above items will represent unsatisfactory completion of internship.

APPENDIX - B

20. Internship

Specific Objectives:

(i) To provide patient care in cooperation with patients, prescribers, and other members of an interprofessional health care team based upon sound therapeutic principles and evidence-based data, taking into account relevant legal, ethical, social cultural, economic, and professional issues, emerging technologies, and evolving biomedical, pharmaceutical, social or behavioral or administrative, and clinical sciences that may impact therapeutic outcomes.

(ii) To manage and use resources of the health care system, in cooperation with patients, prescribers, other health care providers, and administrative and supportive personnel, to promote health; to provide, assess, and coordinate safe, accurate, and time-sensitive medication distribution; and to improve therapeutic outcomes of medication use.

(iii) To promote health improvement, wellness, and disease prevention in co-operation with patients, communities, at-risk population, and other members of an interprofessional team of health care providers.

(iv) To demonstrate skills in monitoring of the National Health Programmes and schemes, oriented to provide preventive and promotive health care services to the community.

(v) To develop leadership qualities to function effectively as a member of the health care team organised to deliver the health and family welfare services in existing socio-economic, political and cultural environment.

(vi) To communicate effectively with patients and the community.

Other details

1) All parts of the internship shall be done, as far as possible, in institutions in India. In case of any difficulties, the matter may be referred to the Pharmacy Council of India to be considered on merits.

2) Where an intern is posted to district hospital for training, there shall be a committee consisting of representatives of the college or university, and the district hospital administration, who shall regulate the training of such trainee. For such trainee a certificate of satisfactory completion of training shall be obtained from the relevant administrative authorities which shall be countersigned by the Principal or Dean of College.

3) Every candidate shall be required, after passing the final Pharm.D. or Pharm.D. (Post Baccalaureate) examination as the case may be to undergo compulsory rotational internship to the satisfaction of the College authorities and University concerned for a period of twelve months so as to be eligible for the award of the degree of Pharm.D. or Pharm.D. (Post Baccalaureate) as the case may be.

Assessment of Internship

(i) Each intern student shall have a minimum of 80% attendance in every month, and a total of 80% at end for satisfactory completion of internship.

(ii) The intern shall maintain a record of work which is to be verified and certified by the preceptor (teacher practitioner) under whom he works. Apart from scrutiny of the record of work, assessment and evaluation of training shall be undertaken by an objective approach using situation tests in knowledge, skills and attitude during and at the end of the training. Based on the record of work and date of evaluation, the Dean or Principal shall issue certificate of satisfactory completion of training, following which the university shall award the degree or declare him eligible for it.

(iii) Satisfactory completion of internship shall be determined on the basis of the following:

1. Proficiency of knowledge required for each case management SCORE 0-5
2. The competency in skills expected for providing Clinical Pharmacy Services SCORE 0-5
3. Responsibility, punctuality, work up of case, involvement in patient care SCORE 0-5
4. Ability to work in a team (Behaviour with other healthcare professionals including medical doctors, nursing staff and colleagues). SCORE 0-5
5. Initiative, participation in discussions, research aptitude. SCORE 0-5

Poor	Fair	Below Average	Average	Above Average	Excellent
0	1	2	3	4	5

A Score of less than 3 in any of above items will represent unsatisfactory completion of internship.

21. Transitory regulations:

Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 2. and continue to be in the academic regulations they were first admitted.

22. With – holding of results:

If the candidate has not paid dues to the university or if any case of in-discipline or malpractice is pending against him, the result of the candidate shall be withheld and he will not be allowed/ promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

23. General:

i. The academic regulations should be read as a whole for purpose of any interpretation.

ii. Disciplinary action for Malpractice / improper conduct in examinations is appended.

iii. Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".

iv. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.

v. The University may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on roles with effect from the dates notified by the University.

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RULES FOR

DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	**Punishment**
	If the candidate:	
1.(a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred for four consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for four consecutive semesters from class work and all University examinations, if his involvement is established. Otherwise, the candidate is debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.

4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from classwork and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject only.
6.	Refuses to obey the orders of the Chief Superintendent /Assistant - Superintendent /any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. If the candidate physically assaults the invigilator/ officer-in-charge of the Examinations, then the candidate is also debarred and forfeits his/her seat. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.

9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person (s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject only or in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester / year examinations, depending on the recommendation of the committee.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators.

i) Punishments to the candidates as per the above guidelines.
ii) Punishment for institutions: (if the squad reports that the college is also involved in encouraging malpractices)
iii) A show cause notice shall be issued to the college.
iv) Impose a suitable fine on the college.
v) Shifting the examination center from the college to another college for a specific period of not less than one year.

Note: Whenever the performance of a student is cancelled in any subject/subjects due to Malpractice, he/she has to register for End Examinations in that subject/subjects consequently and has to fulfil all the norms required for the award of Degree.

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P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY (AUTONOMOUS), KADAPA.

Pharm. D - I YEAR

(25T00101) HUMAN ANATOMY & PHYSIOLOGY (THEORY)

Theory: 3 Hrs. /Week

1. **Scope and Objectives:** This course is designed to impart a fundamental knowledge on the structure and functions of the human body. It also helps in understanding both homeostasis mechanisms and homeostatic imbalances of various body systems. Since a medicament, which is produced by pharmacist, is used to correct the deviations in human body, it enhances the understanding of how the drugs act on the various body systems in correcting the disease state of the organs.
2. **Upon completion of the course the student shall be able to:**
   a. Describe the structure (gross and histology) and functions of various organs of the human body;
   b. Describe the various homeostatic mechanisms and the ir imbalances of various systems;
   c. Identify the various tissues and organs of the different systems of the human body;
   d. Perform the hematological tests and also record blood pressure, heart rate, pulse and Respiratory volumes;
   e. Appreciate coordinated working pattern of different organs of each system; and
   f. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body
3. **Course materials:**

Text books

   a. Tortora Gerard J. and Nicholas, P. Principles of anatomy and physiology Publisher Harpercollins college New York.
   b. Wilson, K.J.W. Ross and Wilson's foundations of anatomy and physiology. Publisher: Churchill Livingstone, Edinburg.

Reference books

   a. Guytonarthur, C. Physiology of human body. Publisher: Holtsaunders.
   b. Chatterjee,C.C. Human physiology. Volume 1&11. Publisher: medical allied agency, Calcutta.
   c. Peter L. Williams, Roger Warwick, Mary Dyson and Lawrence, H.
   d. Gray's anatomy. Publisher: Churchill Livingstone, London.

4. **Lecture wise program: Topics**

1 i) Scope of anatomy and physiology, basic terminologies used in this subject (Description of the body as such planes and terminologies)
ii) Structure of cell – its components and their functions.
Elementary tissues of the human body: epithelial, connective, Muscular and nervous tissues-their sub-types and characteristics
i) Osseous system - structure, composition and functions of the Skeleton. (Done in practical classes - 6hrs)
iii) Classification of joints, Types of movements of joints and disorders of joints (Definitions only)

2 i) <u>Haemopoetic System</u>
a) Composition and functions of blood
b) Haemopoesis and disorders of blood components (definition of disorder)
c) Blood groups
d) Clotting factors and mechanism

e) Platelets and disorders of coagulation

ii) Lymph
a) Lymph and lymphatic system, composition, formation and circulation.
b) Spleen: structure and functions, Disorders
c) Disorders of lymphatic system (definition only)

iii) Cardiovascular system
a) Anatomy and functions of heart
b) Blood vessels and circulation (Pulmonary, coronary and systemic circulation)
c) Electrocardiogram (ECG)
d) Cardiac cycle and heart sounds
e) Blood pressure – its maintenance and regulation
f) Definition of the following disorders: Hypertension, Hypotension, Arteriosclerosis, Atherosclerosis, Angina, Myocardial infarction, Congestive heart failure, Cardiac arrhythmias

3 i) Respiratory system
a) Anatomy of respiratory organs and functions
b) Mechanism / physiology of respiration and regulation of respiration
c) Transport of respiratory gases
d) Respiratory volumes and capacities, and Definition of: Hypoxia, Asphyxia, Dysbarism, Oxygen therapy and resuscitation.

ii) Digestive system
a) Anatomy and physiology of GIT
b) Anatomy and functions of accessory glands of GIT
c) Digestion and absorption
d) Disorders of GIT (definitions only)

iii) Nervous system
a) Definition and classification of nervous system
b) Anatomy, physiology and functional areas of cerebrum
c) Anatomy and physiology of cerebellum
d) Anatomy and physiology of mid brain
e) Thalamus, hypothalamus and Basal Ganglia
f) Spinal card: Structure & reflexes – mono-poly-planter
g) Cranial nerves – names and functions
h) ANS – Anatomy & functions of sympathetic & parasympathetic N.S.

4 i) Urinary system
a) Anatomy and physiology of urinary system
b) Formation of urine
c) Renin Angiotensin system – Juxtaglomerular apparatus - acid base Balance
d) Clearance tests and micturition

ii) Endocrine system
a) Pituitary gland
b) Adrenal gland
c) Thyroid and Parathyroid glands
d) Pancreas and gonads

iii) Reproductive system
a) Male and female reproductive system
b) Their hormones – Physiology of menstruation
c) Spermatogenesis & Oogenesis
d) Sex determination (genetic basis)
e) Pregnancy and maintenance and parturition
f) Contraceptive devices

5 i) Sense organs
a) Eye
b) Ear
c) Skin
d)Tongue & Nose

ii) Skeletal muscles
a) Histology
b) Physiology of Muscle contraction
c)Physiological properties of skeletal muscle and their disorders (definitions)

iii) Sports physiology
a) Muscles in exercise, Effect of athletic training on muscles and muscle performance,
b) Respiration in exercise, CVS in exercise, Body heat in exercise, Body fluids and salts in exercise,
c) Drugs and athletics

P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY (AUTONOMOUS), KADAPA.

Pharm. D - I YEAR

(25T00107) HUMAN ANATOMY & PHYSIOLOGY (PRACTICAL)

Practical: 3 Hrs./Week

General Requirements: Dissection box, Laboratory Napkin, muslin cloth, record, Observation book(100pages), Stationary items, Blood lancet.

Course materials:

Text books

Goyal, R. K, Natvar M.P, and Shah S.A, Practical anatomy, physiology and biochemistry, latest edition, Publisher: B.S Shah Prakashan, Ahmedabad.

Reference books

Ranade VG, Text book of practical physiology, Latest edition, Publisher: PVG, Pune Anderson Experimental Physiology, Latest edition, Publisher: NA

List of Experiments:

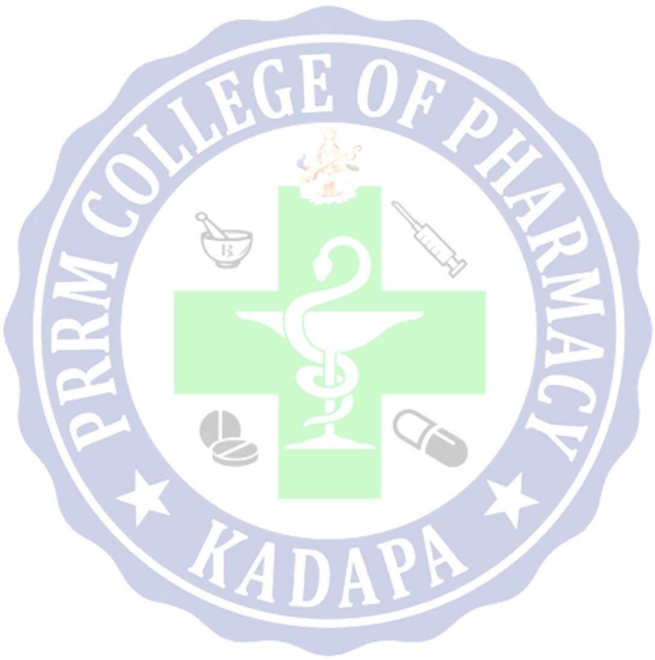
1. Study of tissues of human body
   (a) Epithelial tissue.
   (b) Muscular tissue.
2. Study of tissues of human body
   (a) Connective tissue.
   (b) Nervous tissue.
3. Study of appliances used in hematological experiments.
4. Determination of W.B.C. count of blood.
5. Determination of R.B.C. count of blood.
6. Determination of differential count of blood.
7. Determination of
   (a) Erythrocyte Sedimentation Rate.
   (b) Haemoglobin content of Blood.
   (c) Bleeding time & Clotting time.
8. Determination of
   (a) Blood Pressure.
   (b) Blood group.
9. Study of various systems with the help of charts, models & specimens
   (a) Skeleton system part I-axial skeleton.
   (b) Skeleton system part II- appendicular skeleton.
   (c) Cardiovascular system.
   (d) Respiratory system.
   (e) Digestive system.
   (f) Urinary system.
   (g) Nervous system.
   (h) Special senses.
   (i) Reproductive system.
10. Study of different family planning appliances.
11. To perform pregnancy diagnosis test.
12. Study of appliances used in experimental physiology.
13. To record simple muscle curve using gastroenemius sciatic nerve preparation.
14. To record simple summation curve using gastroenemius sciatic nerve preparation.
15. To record simple effect of temperature using gastroenemius sciatic nerve preparation.

16. To record simple effect of load & after load using gastroenemius sciatic nerve preparation.
17. To record simple fatigue curve using gastroenemius sciatic nerve preparation.

Scheme of Practical Examination:

	Sessionals	**Annual**
Identification	04	10
Synopsis	04	10
Major Experiment	07	20
Minor Experiment	03	15
Viva	02	15
Max Marks	**20**	**70**
Duration	**03 hrs**	**04 hrs**

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY (AUTONOMOUS), KADAPA.

Pharm. D - I YEAR

(25T00102) PHARMACEUTICS (THEORY)

Theory: 2 Hrs. /Week

1. Scope and objectives: This course is designed to impart a fundamental knowledge on the art and science of formulating different dosage forms. It prepares the students for most basics of the applied field of pharmacy.
2. Upon the completion of the course the student should be able to:
   a. Know the formulation aspects of different dosage forms;
   b. Do different pharmaceutical calculation involved in formulation;
   c. Formulate different types of dosage forms; and
   d. Appreciate the importance of good formulation for effectiveness.
3. **Course materials:**
   Text books
   a. Cooper and Gunns Dispensing for pharmacy students.
   b. A text book Professional Pharmacy by N.K.Jain and S.N.Sharma.
   Reference books
   a. Introduction to Pharmaceutical dosage forms by Howard C. Ansel.
   b. Remington's Pharmaceutical Sciences.
   c. Register of General Pharmacy by Cooper and Gunn.
   d. General Pharmacy by M.L.Schroff.
4. **Lecture wise programme: Topics**

   1. a. Introduction to dosage forms - classification and definitions
      b. Prescription: definition, parts and handling
      c. Posology: Definition, Factors affecting dose selection. Calculation of children and infant doses.
      d. Historical back ground and development of profession of pharmacy and pharmaceutical industry in brief.
   2. i) Development of Indian Pharmacopoeia and introduction to other Pharmacopoeias such as BP, USP, European Pharmacopoeia, Extra pharmacopoeia and Indian national formulary.
      ii) Weights and measures, Calculations involving percentage solutions, allegation, proof spirit, isotonic solutions etc.
   3. i) Powders and Granules: Classification advantages and disadvantages, Preparation of simple, compound powders, Insufflations, Dusting powders, Eutectic and Explosive powders, Tooth powder and effervescent powders and granules.
      ii) Monophasic Dosage forms: Theoretical aspects of formulation including adjuvant like stabilizers, colorants, flavours with examples. Study of Monophasic liquids like gargles,mouth washes, Throat paint, Ear drops, Nasal drops, Liniments and lotions, Enemas and collodions.
   4. A) Biphasic dosage forms: Suspensions and emulsions, Definition, advantages and disadvantages, classification, test for the type of emulsion, formulation, stability and evaluation.
      B) Suppositories and pessaries: Definition, advantages and disadvantages, types of base, method of preparation, Displacement value and evaluation.
      C) Galenicals: Definition, equipment for different extraction processes like infusion, Decoction, Maceration and Percolation, methods of preparation of spirits, tinctures and extracts.

5. i) Pharmaceutical calculations.
   ii) Surgical aids: Surgical dressings, absorbable gelatin sponge, sutures, ligatures and medicated bandages.
   iii) Incompatibilities: Introduction, classification and methods to overcome the incompatibilities.

P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY (AUTONOMOUS), KADAPA.

Pharm. D - I YEAR

(25T00108) PHARMACEUTICS (PRACTICAL)

Practical: 3 Hrs. /Week

List of Experiments:

1. **Syrups**
   a. Simple Syrup I.P
   b. Syrup of Ephedrine Hcl NF
   c. Syrup Vasaka IP
   d. Syrup of ferrous Phosphate IP
   e. Orange Syrup
2. **Elixir**
   a. Piperizine citrate elixir BP
   b. Cascara elixir BPC
   c. Paracetamol elixir BPC
3. **Linctus**
   a. Simple Linctus BPC
   b. Pediatric simple Linctus BPC
4. **Solutions**
   a. Solution of cresol with soap IP
   b. Strong solution of ferric chloride BPC
   c. Aqueous Iodine Solution IP
   d. Strong solution of Iodine IP
   e. Strong solution of ammonium acetate IP
5. **Liniments**
   a. Liniment of turpentine IP*
   b. Liniment of camphor IP
6. **Suspensions***
   a. Calamine lotion
   b. Magnesium Hydroxide mixture BP
7. **Emulsions***
   a. Cod liver oil emulsion
   b. Liquid paraffin emulsion
8. **Powders***
   a. Eutectic powder
   b. Explosive powder
   c. Dusting powder
   d. Insufflations
9. **Suppositories***
   a. Boric acid suppositories
   b. Chloral suppositories

10. Incompatibilities

a. Mixtures with Physical

b. Chemical & Therapeutic incompatibilities

*Colourless bottles required for dispensing Paper envelope (white), butter paper and white paper required for dispensing.

Scheme of Practical Examination:

	Sessionals	**Annual**
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max Marks	**20**	**70**
Duration	**03 hrs**	**04 hrs**

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY (AUTONOMOUS), KADAPA.

Pharm. D - I YEAR

(25T00103) MEDICINAL BIOCHEMISTRY (THEORY)

Theory: 3 Hrs. /Week

1. **Scope of the Subject:** Applied biochemistry deals with complete understanding of the molecular level of the chemical process associated with living cells. Clinical chemistry deals with the study of chemical aspects of human life in health and illness and the application of chemical laboratory methods to diagnosis, control of treatment, and prevention of diseases.
2. **Objectives of the Subject** (Know, do, appreciate) :
   The objective of the present course is providing biochemical facts and the principles to the students of pharmacy. Upon completion of the subject student shall be able to –
   a. Understand the catalytic activity of enzymes and importance of isoenzymes in diagnosis of diseases;
   b. Know the metabolic process of biomolecules in health and illness (metabolic disorders);
   c. Understand the genetic organization of mammalian genome; protein synthesis; replication; mutation and repair mechanism;
   d. Know the biochemical principles of organ function tests of kidney, liver and endocrine gland; and
   e. Do the qualitative analysis and determination of biomolecules in the body fluids.

   Text books (Theory)
   a. Harpers review of biochemistry - Martin
   b. Text book of biochemistry – D. Satyanarayana
   c. Text book of clinical chemistry- Alex Kaplan & LaverveL.Szabo

   Reference books (Theory)
   a. Principles of biochemistry -- Lehninger
   b. Text book of biochemistry -- Ramarao
   c. Practical Biochemistry-David T.Plummer.
   d. Practical Biochemistry-Pattabhiraman.
3. **Lecture wise programme: Topics**

   1. **a. Introduction to biochemistry:** Cell and its biochemical organization, transport process across the cell membranes. Energy rich compounds; ATP, Cyclic AMP and their biological significance.
      b. Enzymes: Definition; Nomenclature; IUB classification; Factor affecting enzyme activity; Enzyme action; enzyme inhibition. Isoenzymes and their therapeutic and diagnostic applications; Coenzymes and their biochemical role and deficiency diseases.
   2. **i) Carbohydrate metabolism:** Glycolysis, Citric acid cycle (TCA cycle), HMP shunt, Glycogenolysis, gluconeogenesis, glycogenesis. Metabolic disorders of carbohydrate metabolism (diabetes mellitus and glycogen storage diseases); Glucose, Galactose tolerance test and their significance; hormonal regulation of carbohydrate metabolism.
      ii) Lipid metabolism: Oxidation of saturated (β-oxidation); Ketogenesis and ketolysis; biosynthesis of fatty acids, lipids; metabolism of cholesterol; Hormonal regulation of lipid metabolism. Defective metabolism of lipids (Atheroslerosis, fatty liver, hypercholesterolmiea).
   3. **i) Biological oxidation:** Coenzyme system involved in Biological oxidation. Electron transport chain (its mechanism in energy capture; regulation and inhibition); Uncouplers of ETC; Oxidative phosphorylation;

iii) Protein and amino acid metabolism: protein turn over; nitrogen balance; Catabolism of Amino acids (Transamination, deamination & decarboxylation). Urea cycle and its metabolic disorders; production of bile pigments; hyperbilirubinemia, porphoria, jaundice. Metabolic disorder of Amino acids.

iv) Nucleic acid metabolism: Metabolism of purine and pyrimidine nucleotides; Protein synthesis; Genetic code; inhibition of protein synthesis; mutation and repair mechanism; DNA replication (semiconservative /onion peel models) and DNA repair mechanism.

4. **Introduction to clinical chemistry:** Cell; composition; malfunction; Roll of the clinical chemistry laboratory.

   The kidney function tests: Role of kidney; Laboratory tests for normal function includes-

   a) Urine analysis (macroscopic and physical examination, quantitative and semiquantitative tests.)

   b) Test for NPN constituents. (Creatinine /urea clearance, determination of blood and urine creatinine, urea and uric acid)

   c) Urine concentration test

   d) Urinary tract calculi. (stones)

   Liver function tests: Physiological role of liver, metabolic, storage, excretory, protective, circulatory functions and function in blood coagulation.

   a) Test for hepatic dysfunction-Bile pigments metabolism.

   b) Test for hepatic function test- Serum bilirubin, urine bilirubin, and urine urobilinogen.

   c) Dye tests of excretory function.

   d) Tests based upon abnormalities of serum proteins.
   Selected enzyme tests.

5. **i) Lipid profile tests:** Lipoproteins, composition, functions. Determination of serum lipids, total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides.

   ii) Immunochemical techniques for determination of hormone levels and protein levels in serum for endocrine diseases and infectious diseases.

   Radio immuno assay (RIA) and Enzyme Linked Immuno Sorbent Assay (ELISA)

   iii) Electrolytes: Body water, compartments, water balance, and electrolyte distribution. Determination of sodium, calcium potassium, chlorides, bicarbonates in the body fluids.

P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY (AUTONOMOUS), KADAPA.

Pharm. D - I YEAR

(25T00109) MEDICINAL BIOCHEMISTRY (PRACTICAL)

practical: 3 Hrs. /Week

Title of the Experiment:

1. Qualitative analysis of normal constituents of urine.*
2. Qualitative analysis of abnormal constituents of urine.*
3. Quantitative estimation of urine sugar by Benedict's reagent method.**
4. Quantitative estimation of urine chlorides by Volhard's method.**
5. Quantitative estimation of urine creatinine by Jaffe's method.**
6. Quantitative estimation of urine calcium by precipitation method.**
7. Quantitative estimation of serum cholesterol by Libermann Burchard's method.**
8. Preparation of Folin Wu filtrate from blood.*
9. Quantitative estimation of blood creatinine.**
10. Quantitative estimation of blood sugar Folin- Wu tube method.**
11. Estimation of SGOT in serum.**
12. Estimation of SGPT in serum.**
13. Estimation of Urea in Serum.**
14. Estimation of Proteins in Serum.**
15. Determination of serum bilirubin**
16. Determination of Glucose by means of Glucoseoxidase.**
17. Enzymatic hydrolysis of Glycogen/Starch by Amylases.**
18. Study of factors affecting Enzyme activity. (pH& Temp.)**
19. Preparation of standard buffer solutions and its pH measurements (any two)*
20. Experiment on lipid profile tests**
21. Determination of sodium, calcium and potassium in serum.**

** indicate major experiments & * indicate minor experiments

Assignments:

Format of the assignment

1. Minimum & Maximum number of pages.
2. It shall be computer draft copy.
3. Reference(s) shall be included at the end.
4. Name and signature of the student.
5. Assignment can be a combined presentation at the end of the academic year.
6. Time allocated for presentation may be 8+2 Min.

Scheme of Practical Examination:

	Sessionals	**Annual**
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max Marks	**20**	**70**
Duration	**03 hrs**	**04 hrs**

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY (AUTONOMOUS), KADAPA.

Pharm. D - I YEAR

(25T00104) PHARMACEUTICAL ORGANIC CHEMISTRY (THEORY)

Theory: 3 Hrs. /Week

1. **Scope and objectives:** This course is designed to impart a very good knowledge about
   a. IUPAC/Common system of nomenclature of simple organic compounds belonging to different classes of organic compounds;
   b. Some important physical properties of organic compounds;
   c. Free radical/ nucleophyllic [alkyl/ acyl/ aryl] /electrophyllic substitution, free radical/ nucleophyllic / electrophyllic addition, elimination, oxidation andreduction reactions with mechanism, orientation of the reaction, order of reactivity, stability of compounds;
   d. Some named organic reactions with mechanisms; and
   e. Methods of preparation, test for purity, principle involved in the assay, important medicinal uses of some important organic compounds.
2. **Course materials:**
   Text books
   a. T.R.Morrison and R. Boyd - Organic chemistry,
   b. Bentley and Driver-Text book of Pharmaceutical chemistry
   c. I.L.Finer- Organic chemistry, the fundamentals of chemistry
   Reference books
   a. Organic chemistry – J.M.Cram and D.J.Cram
   b. Organic chemistry- Brown
   c. Advanced organic chemistry- Jerry March, Wiley
   d. Organic chemistry- Cram and Hammered, Pine Hendrickson
3. **Lecture wise programme: Topics**

   1. i) Structures and Physical properties:
   a. Polarity of bonds, polarity of molecules, M.P, Inter molecular forces, B.P,Solubility, non ionic solutes and ionic solutes, protic and aprotic Solvents, ion pairs,
   b. Acids and bases, Lowry bronsted and Lewis theories
   c. Isomerism
   ii) Nomenclature of organic compound belonging to the following classes Alkanes, Alkenes, Dienes, Alkynes, Alcohols, Aldehydes, Ketones, Amides, Amines, Phenols, Alkyl Halides, Carboxylic Acid, Esters, Acid Chlorides And Cycloalkanes.
   iii) Free radicals chain reactions of alkane : Mechanism, relative reactivity and stability
   iv) Alicyclic compounds: Preparations of cyclo alkanes, Bayer strain theory and orbital picture of angle strain.

   2. i) Nuclophilic aliphatic substitution mechanism: Nucleophiles and leaving groups, kinetics of second and first order reaction, mechanism and kinetics of SN 2 reactions. Stereochemistry and steric hindrance, role of solvents, phase transfer catalysis, mechanism and kinetics of SN1 reactions, stereochemistry, carbocation and their stability, rearrangement of carbocation, role of solvents in SN1 reaction, Ion dipole bonds, SN2 versus SN1 solvolyses, nucleophilic assistance by the solvents.
   ii) Dehydro halogenation of alkyl halides: 1,2 elimination, kinetics, E2 and E1 mechanism, elimination via carbocation, evidence for E2 mechanism, absence of rearrangement isotope effect, absence hydrogen exchange, the element effect, orientation and reactivity, E2 versus E1, elimination versus substitution, dehydration of alcohol, ease of dehydration, acid catalysis, reversibility, orientation.

iii) Electrophillic and free radicals addition: Reactions at carbon-carbon, double bond, electrophile, hydrogenation, heat of hydrogenation and stability of alkenes, markownikoff rule, addition of hydrogen halides, addition of hydrogen bromides, peroxide effect, electrophillic addition, mechanism, rearrangement, absence ofhydrogen exchange, orientation and reactivity, addition of halogen, mechanism, halohydin formation, mechanism of free radicals additon, mechanism of peroxide initiated addition of hydrogen bromide, orientation of free addition, additions of carbene to alkene, cyclo addition reactions.

iv) Carbon-carbon double bond as substituents: Free radical halogenations ofalkenes, comparision of free radical substitution with free radical addition, free radical substitution in alkenes, orientation and reactivity, allylic rearrangements.

3. i) Theory of resonance: Allyl radical as a resonance hybrid, stability, orbital picture, resonance stabilisation of allyl radicals, hyper conjugation, allylcation as a resonance hybrid, nucleophyllic substitution in allylic substrate, SN1 reactivity, allylic rearrangement, resonance stabilisation of allylcation, hyper conjugation, nucleophilic substitution in allylic substrate, SN2 nucleophilic substituion in vinylic substrate, vinyliccation, stability of conjugated dienes, resonance in alkenes, hyper conjugation, ease of formation of conjugated dienes, orientation of elimination, electrophilic addition to conjugated dienes, 1,4- addition, 1,2-versus 1,4-addition, rate versus equilibrium, orientation and reactivity of free radical addition to conjugated dienes.

ii) Elecrophilic aromatic substitution: Effect of substituent groups, determination of orientation, determination of relative reactivity, classification of substituent group, mechanism of nitration, sulphonation, halogenation, friedel craft alkylation, friedel craft acylation, reactivity and orientation, activating and deactivating O,P,M directing groups, electron release via resonance, effect of halogen on electrophilic aromatic substitution in alkyl benzene, side chain halogination of alkyl benzene, resonance stabilization of benzyl radical.

4. i) Nucleophilic addition reaction: Mechanism, ionisation of carboxylic acids, acidity constants, acidity of acids, structure of carboxylate ions, effect of substituent on acidity, nucleophilic acyl substitution reaction, conversion of acidto acid chloride, esters, amide and anhydride. Role of caboxyl group, comparison of alkyl nucleophilic substitution with acyl nucleophilic substitution.

ii) Mechanism of aldol condensation, claisen condensation, cannizzaro reaction, crossed aldol condensation, crossed cannizzaro reaction, benzoin condensation, perkin condensation. Knoevenagel, Reformatsky reaction, Wittig reaction, Michael addition.

iii) Hoffman rearrangement: Migration to electron deficient nitrogen, Sandmeyer's reaction, basicity of amines, diazotisation and coupling, acidity of phenols, Williamson synthesis, Fries rearrangement, Kolbe reaction, Reimer tieman's reactions.

5. i) Nucleophilic aromatic substitution: Bimolecular displacement mechanisms, orientation, comparison of aliphatic nucleophilic substitution with that of aromatic.

ii) Oxidation reduction reaction.

iii) Study of the following official compounds- preparation, test for purity, assay and medicinal uses of Chlorbutol, Dimercaprol, Glyceryltrinitrate, Urea, Ethylene diamine dihyrate, Vanillin, Paraldehyde, Ethylene chloride, Lactic acid, Tartaric acid, citric acid, salicylic acid, aspirin, methyl salicylate, ethyl benzoate, benzylbenzoate, dimethyl pthalate, sodium lauryl sulphate, saccharin sodium, mephensin.

P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY (AUTONOMOUS), KADAPA.

Pharm. D - I YEAR

(25T00110) PHARMACEUTICAL ORGANIC CHEMISTRY (PRACTICAL)

Practical: 3 Hrs. /Week

I. Introduction to the various laboratory techniques through de monstration involving synthesis of the following compounds (at least 8 compounds to be synthesised):

1. Acetanilde / aspirin (Acetylation)
2. Benzanilide / Phenyl benzoate (Benzoylation)
3. P-bromo acetanilide / 2,4,6 – tribromo aniline (Bromination)
4. Dibenzylidene acetone (Condensation)
5. 1-Phenylazo-2-napthol (Diazotisation and coupling)
6. Benzoic acid / salicylic acid (Hydrolysis of ester)
7. M-dinitro benzene (Nitration)
8. 9, 10 – Antharaquinone (Oxidation of anthracene) / preparation of benzoic acid from toluene or benzaldehyde
9. M-phenylene diamine (Reduction of M-dinitrobenzene) / Aniline from nitrobenzene
10. Benzophenoneoxime
11. Nitration of salicylic acid
12. Preparation of picric acid
13. Preparation of O-chlorobenzoic acid from O-chlorotolune
14. Preparation of cyclohexanone from cyclohexanol

II. Identification of organic compounds belonging to the following classes by:

Systematic qualitative organic analysis including preparation of derivatives Phenols, amides, carbohydrates, amines, carboxylic acids, aldehyde and ketones, Alcohols, esters, hydrocarbons, anilides, nitrocompounds.

III. Introduction to the use of stereo models:

Methane, Ethane, Ethylene, Acetylene, Cis alkene, Trans alkene, inversion of configuration.

Scheme of Practical Examination:

	Sessionals	**Annual**
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max Marks	**20**	**70**
Duration	**03 hrs**	**04 hrs**

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY (AUTONOMOUS), KADAPA.

Pharm. D - I YEAR

(25T00105) PHARMACEUTICAL INORGANIC CHEMISTRY (THEORY)

Theory: 2 Hrs. /Week

1. Scope and objectives: This course mainly deals with fundamentals of Analytical chemistry and also the study of inorganic pharmaceuticals regarding their monographs and also the course deals with basic knowledge of analysis of various pharmaceuticals.
2. Upon completion of the course student shall be able to:
   a. Understand the principles and procedures of analysis of drugs and also regarding the application of inorganic pharmaceuticals;
   b. Know the analysis of the inorganic pharmaceuticals their applications; and
   c. Appreciate the importance of inorganic pharmaceuticals in preventing and curing the disease.
3. **Course materials:**
   Text books
   a. A text book Inorganic medicinal chemistry by Surendra N. Pandeya
   b. A. H. Beckett and J. B. Stanlake's Practical Pharmaceutical chemistry Vol-I &Vol-II
   c. Inorganic Pharmaceutical Chemistry III-Edition P.Gundu Rao
   Reference books
   a. Inorganic Pharmaceutical Chemistry by Anand & Chetwal
   b. Pharmaceutical Inorganic chemistry by Dr. B. G. Nagavi
   c. Analytical chemistry principles by John H. Kennedy d. I.P.1985 and 1996, Govt. of India, Ministry of health
4. **Lecture wise programme: Topics**

   1. A. Errors
      B. Volumetric analysis
      C. Acid-base titrations
      D. Redox titrations
   2. A. Non aqueous titrations
      B. Precipitation titrations
      C. Complexometric titrations
      D. Theory of indicators
   3. A. Gravimetry
      B. Limit tests
      C. Medicinal gases
      D. Acidifiers
   4. A. Antacids
      B. Cathartics
      C. Electrolyte replenishers
      D. Essential Trace elements
   5. A. Antimicrobials
      B. Pharmaceutical aids
      C. Dental Products
      D. Miscellaneous compounds
      E. Radio Pharmaceuticals

P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY (AUTONOMOUS), KADAPA.

Pharm. D - I YEAR

(25T00111) PHARMACEUTICAL INORGANIC CHEMISTRY (PRACTICAL)

Practical: 3 Hrs. /Week

1. **Limit test (6 exercises)**
   a. Limit test for chlorides
   b. Limit test for sulphates
   c. Limit test for iron
   d. Limit test for heavy metals
   e. Limit test for arsenic
   f. Modified limit tests for chlorides and sulphates

2. **Assays (10 exercises)**
   a. Ammonium chloride- Acid-base titration
   b. Ferrous sulphate- Cerimetry
   c. Coppersulpahte- Iodometry
   d. Calcilugluconate- Complexometry
   e. Hydrogen peroxide – Permanganometry
   f. Sodium benzoate – Nonaqueous titration
   g. Sodium chloride – Modified volhard's method
   h. Assay of KI – KIO3 titration
   i. Gravimetric estimation of barium as barium sulphate
   j. Sodium antimony gluconate or antimony potassium tartarate

3. **Estimation of mixture (Any two exercises)**
   a. Sodium hydroxide and sodium carbonate
   b. Boric acid and Borax
   c. Oxalic acid and sodium oxalate

4. **Test for identity (Any three exercises)**
   a. Sodium bicorbonate
   b. Barium sulphate
   c. Ferrous sulphate
   d. Potassium chloride

5. **Test for purity (Any two exercises)**
   a. Swelling power in Bentonite
   b. Acid neutralising capacity in aluminium hydroxide gel
   c. Ammonium salts in potash alum
   d. Adsorption power heavy Kaolin
   e. Presence of Iodates in KI

6. Preparations (Any two exercises)

a. Boric acids
b. Potash alum
c. Calcium lactate
d. Magnesium suphate

Scheme of Practical Examination:

	Sessionals	**Annual**
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max Marks	**20**	**70**
Duration	**03 hrs**	**04 hrs**

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY (AUTONOMOUS), KADAPA.

Pharm. D - I YEAR

(25T00106) REMEDIAL MATHEMATICS/BIOLOGY (THEORY)

Theory: 3 Hrs. /Week

REMEDIAL MATHEMATICS:

1. **Scope and objectives:** This are an introductory course in mathematics. This subject deals with the introduction to matrices, determinants, trigonometry, analytical geometry, differential calculus, integral calculus, differential equations, laplace transform.
2. **Upon completion of the course the student shall be able to : –**
   a. Know Trignometry, Analytical geometry, Matrices, Determinant, Integration, Differential equation, Laplace transform and their applications;
   b. Solve the problems of different types by applying theory; and
   c. Appreciate the important applications of mathematics in pharmacy.
3. **Course materials:**
   Text books
   a. Differential calculus By Shantinarayan
   b. Text book of Mathematics for second year pre- university by Prof. B.M. Sreenivas
   Reference books
   a. Integral calculus By Shanthinarayan
   b. Engineering mathematics By B.S. Grewal
   c. Trigonometry Part-I By S. L. Loney
4. **Lecture wise programme: Topics**

1	**i) Algebra:** Determinants, Matrices **ii) Trigonometry:** Sides and angles of a triangle, solution of triangles
2	**Differential calculus:** Limit of a function, Differential calculus, Differentiation of a sum, Product, Quotient Composite, Parametric, exponential, trigonometric and Logarithmic function. Successive differentiation, Leibnitz's theorem, Partial differentiation, Euler's theorem on homogeneous functions of two variables
3	**Integral Calculus:** Definite integrals, integration by substitution and by parts, Properties of definite integrals.
4	**Differential equations:** Definition, order, degree, variable separable, homogeneous, Linear, heterogeneous, linear, differential equation with constant coefficient, simultaneous linear equation of second order.
5	**i) Analytical Geometry:** Points, Straight line, circle, parabola **ii) Laplace transform:** Definition, Laplace transform of elementary functions, Properties of linearity and shifting.

BIOLOGY:

1. **Scope and objectives:** This is an introductory course in Biology, which gives detailed study of natural sources such as plant and animal origin. This subject has been introduces to the pharmacy course in order to make the student aware of various naturally occurring drugs and its history, sources, classification, distribution and the characters of the plants and animals. This subject gives basic foundation to Pharmacognosy.
2. **Course materials:**
   Text books
   a. Text book of Biology by S.B. Gokhale

b. A Text book of Biology by Dr.Thulajappa and Dr.Seetaram.

Reference books

a. A Text book of Biology by B.V.Sreenivasa Naidu
b. A Text book of Biology by Naidu and Murthy
c. Botany for Degree students By A.C.Dutta.
d. Outlines of Zoology by M.Ekambaranathaayyer and T.N.Ananthakrishnan.
e. A manual for pharmaceutical biology practical by S.B.Gokhale and C.K.Kokate.

3. Lecture wise programme: Topic

PART – A

01 Introduction
General organization of plants and its inclusions
Plant tissues
Plant kingdom and its classification
Morphology of plants
Root, Stem, Leaf and Its modifications

02 Inflorescence and Pollination of flowers
Morphology of fruits and seeds
Plant physiology

03 Taxonomy of Leguminosae, umbelliferae, Solanaceae, Lilliaceae, Zinziberaceae, Rubiaceae
Study of Fungi, Yeast, Penicillin and Bacteria

PART-B

04 Study of Animal cell
Study animal tissues
Detailed study of frog

05 Study of Pisces, Raptiles, Aves
Genearal organization of mammals
Study of poisonous animals

P. RAMI REDDY MEMORIAL COLLEGE OF PHARMACY (AUTONOMOUS), KADAPA.

Pharm. D - I YEAR

(25T00112) BIOLOGY (PRACTICAL)

Practical: 3 Hrs. /Week

Title:

1. Introduction of biology experiments
2. Study of cell wall constituents and cell inclusions
3. Study of Stem modifications
4. Study of Root modifications
5. Study of Leaf modifications
6. Identification of Fruits and seeds
7. Preparation of Permanent slides
8. T.S. of Senna, Cassia, Ephedra, Podophyllum.
9. Simple plant physiological experiments
10. Identification of animals
11. Detailed study of Frog
12. Computer based tutorials

Scheme of Practical Examination:

	Sessionals	**Annual**
Identification	04	10
Synopsis	04	10
Major Experiment	07	20
Minor Experiment	03	15
Viva	02	15
Max Marks	**20**	**70**
Duration	**03 hrs**	**04 hrs**

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).