Sri Padmavathi School of Pharmacy (Autonomous)

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(Conferred Autonomous status from the academic year 2024-25)
Accorded under Sections 2 (f) and 12 (B) of UGC act 1956 and Accredited by National Board of Accreditation (NBA) for UG and National Assessment & Accreditation Council (NAAC),Approved by PCI and AICTE, New Delhi

Academic Regulations-PR24
Program Structure
&
Syllabus

Effective from AY 2024-25 onwards

Doctor of Pharmacy (Pharm. D)
(REGULAR SIX YEAR COURSE)

Awarding University
Jawaharlal Nehru Technological University Anantapur
JNTUA

Introduction to the Document

The regulations published in this document are official guidelines by the Board of studies (BoS) and Academic council of Sri Padmavathi School of Pharmacy (SPSP) - Autonomous, Andhra Pradesh. The document is a fusion product based on recommendations and guidelines stipulated for syllabus structure by UGC, AICTE, PCI, New Delhi.

- Academic regulations stipulated by Jawaharlal Nehru Technological University Anantapur (JNTUA), Ananthapuramu, Andhra Pradesh.
- Experts' opinion from the Board of Studies, Academic Council constituting approved Advisory boards members includes both academicians and researchers from reputed organizations at national and international levels.
- Suggestions and inputs from members of academic council and Board of studies.
- Recommendations based on feedback from alumni, employers, faculty, students, parents and other experts from allied area.
- This academic regulations, Program structure & Syllabus document has been prepared to ensure quality system in teaching and learning process, examination, assessment, and functioning of other academic related matters to the satisfaction of stakeholders, such as students, parents, alumni, employers, faculty, etc. This document provides core principles of academic regulations duly approved by academic council and board of studies of this institution. The Implementation of these academic regulations shall lead to be considered in the institute and thereby enrich the quality of education and research in the field of pharmaceutical sciences. The guidelines shall aid the transparency and accountability in the administration set up. The list of objectives for implementing academic regulations and course structure through these guidelines are listed below,
    - To improve the academic regulations and course structure.
    - To strengthen the Industry-Institute interaction.
    - To comply with rules and regulations of regulatory bodies like U G C , JNTUA, PCI, AICTE etc.,
    - To meet the requirements of accreditation council and board.
    - To enhance the quality of teaching-learning process and assessments.
    - To provide career support programs, training for enhancing quality in placements and higher education.
    - To place improved systems for feedback, self-appraisal of faculty and staff.
    - To create bench marking with other institutes of repute.

Preamble

The regulations stated herein below shall be called as a document of "Academic regulations, Program structure & Syllabus for Pharm.D " Sri Padmavathi School of Pharmacy (SPSP) - Autonomous, Andhra Pradesh.

These regulations shall be in force from the batch admitted from 2024 -2025 by the date of ratification by the Academic council and Board of studies (BoS) of the institute.

In the event of any doubt about the interpretation of these regulations, the matter shall be referred to Board of studies (BoS) and Academic council and their decision shall be final.

The Board of studies (BoS) and Academic council shall have the authority to modify, amend and repeal any of the provisions of these regulations from time to time.

Definitions

i. "College" means "Sri Padmavathi School of Pharmacy (SPSP) - Autonomous, Andhra Pradesh".

ii. "Student" means a candidate who has taken admission into B. Pharm course of this college as per the guidelines stipulated from time to time by the regulations of State Government of Andhra Pradesh and the Government of India for admissions into various courses of study and the affiliating university, i.e., Jawaharlal Nehru Technological University, Anantapur (JNTUA), Ananthapuramu, Andhra Pradesh.

iii. "Academic Council" means the Academic council constituted as per the guidelines of UGC.

iv. "Board of Studies" means Board of Studies constituted in each department as per the guidelines of UGC.

v. "Principal" means the Head of the institution

vi. "Head of the Department" means the Head of an Academic Department of the College.

vii. "Faculty member" means the teacher (Assistant/Associate/Professor) working on regular or ad-hoc basis in any of the Academic Departments of the College.

viii. "Program" means a candidate who has chosen to avail degree of B. Pharm of this college as per the marks/ rank awarded by the National/ University/ State common entrance tests, India.

ix. "Course" individual subjects described with content for instructions to the students.

x. "Assessment" means evaluation process for the outcome and grading in term of the marks.

xi. "Credit" means a weight to the time requirements of the academic course in the institute.

VISION OF THE INSTITUTE

To promote holistic learning, nurture ethically strong and highly competent Pharmacy graduates to serve the global healthcare system.

MISSION OF THE INSTITUTE

- ✓ **M1.** To provide innovative and contemporary educational experiences of the highest quality.
- ✓ **M2.** To instil ethics, sense of professionalism, communication and leadership skills.
- ✓ **M3.** To promote and nurture the research and scholarly activities.
- ✓ **M4.** To foster entrepreneurship and life-long learning.

Program Outcomes (POs)

1. PO1: Knowledge

   Demonstrate mastery and application of core knowledge and skills in relation to the evolving biomedical, clinical, epidemiological and social-behavioral sciences. This includes competency in areas supporting high quality pharmacy practice (e.g., pharmaceutics, medicinal chemistry, pharmacokinetics, pharmacodynamics, pharmacology, pathophysiology, pharmacotherapeutics and pharmaceutical care).

2. PO2: Pharmacy Practice

Provide pharmaceutical care including, but not limited to, Medication Therapy Management (MTM), vaccinations and drug therapy monitoring in all practice areas (e.g., inpatient, ambulatory and community practice).

3. PO3: Problem Analysis

   Demonstrate the ability to use critical analysis and problem solving skills for the provision of high quality, evidence-based pharmacy services and patient care.

4. PO4: Modern Tool Usage

   Learn, select and apply appropriate methods & procedures, resources and computing tools with an understanding of the limitations in providing high quality, evidence-based, patient-centered care in cooperation with patients, prescribers and members of the inter-professional health care team.

5. PO5: Leadership Skills

   Locate, appraise and assimilate evidence from scientific studies to enhance the quality of care and services. Effectively utilize information, informatics and technology to optimize learning and patient care.

6. PO6: Professional Identity

   Understand, analyze and communicate the value of their professional roles (e.g. clinical and non-clinical laboratory as required by regulatory bodies etc.)

7. PO7: Ethics

   Demonstrate exemplary professional, ethical and legal behaviors, complying with all state and local laws and

regulations related to pharmacy practice. Contribute to the training of pharmacy students, future colleagues, and the growth and success of the profession.

8. PO8: Communication

   Able to develop written and oral communication skills that contribute effectively for the practice of pharmacy profession and patient care.

9. PO9: Pharmacist and Society

   Effectively educate families, patients, caregivers and other HCPs.

10. PO10: Environment and Sustainability

    Effectively manage medication use systems, Prioritize patient safety and public health, Participate in identifying system errors.

11. PO11: Life-long Learning

    Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of practice of pharmacy profession.

DOCTOR OF PHARMACY (PHARM. D) ACADEMIC REGULATIONS- PR-24

Academic Regulations for Pharm. D (Regular)

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:

1. Duration of the course:

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.

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

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. **Minimum qualification for admission:**

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

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

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

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.

3. Medium of Instruction and Examinations

Medium of Instruction and Examination shall be English.

4. Working days in the academic year

Each academic year shall consist of not less than 200 working days.

5. 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 First year Pharm. D Human values & Professional Ethics (Audit Course), in fifth year Pharm. D Medical and Scientific Writing in Health Research (Audit Course) are included in the course.

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	24PHD101T	Human Anatomy and Physiology	3	1	3	✓	1.7	24PHD107P
1.2	24PHD102T	Pharmaceutics	2	1	3	✓	1.8	24PHD108P
1.3	24PHD103T	Medicinal Biochemistry	3	1	3	✓	1.9	24PHD109P
1.4	24PHD104T	Pharmaceutical Organic Chemistry	3	1	3	✓	2.0	24PHD110P
1.5	24PHD105T	Pharmaceutical Inorganic Chemistry	2	1	3	✓	2.1	24PHD111P
1.6	24PHD106T	Remedial Mathematics/ Biology	3	1	3*	✓	2.2	24PHD112P*
1.7	24PHD113T	Human values & Professional Ethics (Audit Course)	2					
		Total hours	**18**	**6 = (40)**	**18**			

* For Biology

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	24PHD201T	Pathophysiology	3	1	-	-		-
2.2	24PHD202T	Pharmaceutical Microbiology	3	1	3	✓	2.7	24PHD207P
2.3	24PHD203T	Pharmacognosy &Phytopharmaceuticals	3	1	3	✓	2.8	24PHD208P
2.4	24PHD204T	Pharmacology-I	3	1	-	-		-
2.5	24PHD205T	Community Pharmacy	2	1	-	-		-
2.6	24PHD206T	Pharmacotherapeutics-I	3	1	3	✓	2.9	24PHD209P
		Total Hours	**17**	**6 = 32**	**9**			

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	24PHD301T	Pharmacology-II	3	1	3	✓	3.7	24PHD307P
3.2	24PHD302T	Pharmaceutical Analysis	3	1	3	✓	3.8	24PHD308P
3.3	24PHD303T	Pharmacotherapeutics-II	3	1	3	✓	3.9	24PHD309P
3.4	24PHD304T	Pharmaceutical Jurisprudence	2	-	-	-		-
3.5	24PHD305T	Medicinal Chemistry	3	1	3	✓	4.0	24PHD310P
3.6	24PHD306T	Pharmaceutical Formulations	2	1	3	✓	4.1	24PHD311P
		Total hours	**16**	**5 = 36**	**15**			

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	24PHD401T	Pharmacotherapeutics-III	3	1	3	✓	4.7	24PHD407P
4.2	24PHD402T	Hospital Pharmacy	2	1	3	✓	4.8	24PHD408P
4.3	24PHD403T	Clinical Pharmacy	3	1	3	✓	4.9	24PHD409P
4.4	24PHD404T	Biostatistics & Research Methodology	2	1	-	-		-
4.5	24PHD405T	Biopharmaceutics & Pharmacokinetics	3	1	3	✓	4.10	24PHD410P
4.6	24PHD406T	Clinical Toxicology	2	1	-	-		-
		Total hours	**15**	**6 = 33**	**12**			

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	24PHD501T	Clinical Research	3	1	-
5.2	24PHD502T	Pharmacoepidemiology and Pharmacoeconomics	3	1	-
5.3	24PHD503T	Clinical Pharmacokinetics & Pharmacotherapeutic Drug Monitoring	2	1	-
5.4	24PHD504C	Clerkship*	-	1	-
5.5	24PHD505PVV	Project work (Six Months)	-	-	20
5.6	24PHD506T	Medical and Scientific Writing in Health Research (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.

Sixth Year: (INTERNSHIP) (24PHD601)

Internship or residency training including postings in specialty 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

6. **Syllabus:**

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

7. 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.

(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
1.7	Human values & Professional Ethics (Audit Course)#						
				600			600 = 1200

#For Audit course there is no internal and external examinations

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
				600			300 = 900

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 in Health Research (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 examinations

8. Attendance requirements:

A candidate is required to put in at least 80% attendance in theory and practical subjects separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

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

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.

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.

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

9. 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.

10. 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 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).

11. 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 in a single attempt at the Pharm. D examination shall be declared to have passed in first class.

Students securing 75% marks or above in any subject or subjects shall be declared to have passed with distinction in the subject or those subjects provided he or she passes in all the subjects in a single attempt.

12. 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 two subjects shall debar him or her from promotion to the next year classes. 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. Need to add

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.

13. 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).

14. Certificate of passing examination:

Every student who has passed the examinations for the Pharm. D (Doctor of Pharmacy) as the case may be, shall be granted a certificate by the examining authority.

15. 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.

16. 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.

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.

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.

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 authorized 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.

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 exam branch with marks of other subjects.

iv. Evaluation shall be done on the following items:

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

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.

Pharm. D-VI

APPENDIX A
INTERNSHIP (24PHD601)

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, 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 examination as the case may be to undergo compulsory rotational internship to the satisfaction of the College authorities concerned for a period of twelve months so as to be eligible for the award of the degree of Pharm.D.

3. ASSESSMENT OF INTERNSHIP:

i) 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.

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

17. 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 behavioural 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, 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 examination may be to undergo compulsory rotational internship to the satisfaction of the College authorities concerned for a period of twelve months so as to be eligible for the award of the degree of Pharm.D.

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.

18. 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.

19. Award of Degree:

Candidates who fulfil the requirements mentioned above will be eligible for award of degree during the ensuing convocation.

20. Duration for completion of the course of study:

The duration for the completion of the course shall be fixed as double the actual duration of the course and the students have to pass within the said period, otherwise they have to get fresh Registration.

21. Withholding of results:

If the candidate has not paid dues to the college 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.

22. General:

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

(ii) Disciplinary action for Malpractice / improper conduction 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 college 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 college.

23. Rules for Disciplinary Action For Malpractice / 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.
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 and forfeits the 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 two consecutive semesters from class work and all 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 class work and all 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.
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. The candidates also are debarred and forfeit their seats. 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 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	Student of the colleges expulsion from the examination hall and cancellation of the

	connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	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 and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the exam branch for further action to award suitable punishment.	

24. Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.

2. Punishment for institutions: (if the squad reports that the college is also involved in encouraging malpractices)

(i) A show cause notice shall be issued to the college.
(ii) Impose a suitable fine on the college.
(iii)Shifting the examination centre from the college to another college for a specific period of not less than one year.

PHARM D I YEAR

Course Code	HUMAN ANATOMY & PHYSIOLOGY	L	T	P	MARKS
24PHD101T		3	1	-	100

Course Category	Core Course

Course Objective

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.

Course Outcomes

CO1	To learn the structure and functions of various organs of human body.
CO2	To learn the homeostatic mechanisms and their imbalances in various systems
CO3	Able to perform hematological tests, record blood pressure, heart rate, pulse rate, respiratory volumes.
CO4	To Apply the concepts and knowledge of HAP to clinical scenarios.

UNIT I

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

iii) Osseous system - structure, composition and functions of the Skeleton. (done in practical classes - 6hrs)

iv) Classification of joints, Types of movements of joints and disorders of joints (Definitions only)

UNIT II

i. Haemopoetic System

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

UNIT III

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, Dybarism, 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.

UNIT IV

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

UNIT V

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

Text books & Reference books

1. Tortora Gerard J. and Nicholas, P. Principles of anatomy and physiology Publisher Harpercollins College New York.
2. Wilson, K.J.W. Ross and Wilson's foundations of anatomy and physiology. Publisher: Churchill Livingstone, Edinburg.
3. Guytonarthur, C. Physiology of human body. Publisher: Holtsaunders.
4. Chatterjee,C.C. Human physiology. Volume 1&11. Publisher: medical allied agency, Calcutta.
5. Peter L. Williams, Roger Warwick, Mary Dyson and Lawrence, H.
6. Gray's anatomy. Publisher: Churchill Livingstone, London.

Course Code	HUMAN ANATOMY & PHYSIOLOGY LAB	L	T	P	MARKS
24PHD101P		0	0	3	100

Course Category	Core Course
Course Objective	
Course Outcomes	
CO1	To Understand the principles of hematological tests, recording blood pressure, heart rate, pulse and Respiratory volumes.
CO2	Study of different family planning appliances. To perform pregnancy diagnosis test.and To record simple muscle curve using gastroenemius sciatic nerve preparation
CO3	Able to study various systems with the help of charts, models and specimens.

List of Experiments

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

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) Hemoglobin 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.

Text books & Reference books

1. Goyal, R. K, Natvar M.P, and Shah S.A, Practical anatomy, physiology and biochemistry, latest edition, Publisher: B.S Shah Prakashan, Ahmedabad.
2. Ranade VG, Text book of practical physiology, Latest edition, Publisher: PVG, Pune
   Anderson Experimental Physiology, Latest edition, Publisher: NA

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	**03hrs**	**04hrs**

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

Course Code	PHARMACEUTICS	L	T	P	MARKS
24PHD102T		2	1	-	100

Course Category	Core Course

Course Objective

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.

Course Outcomes

CO1	Understand formulation aspects of different dosage forms along with prescription handling with calculation of doses
CO2	resolve various calculations pertaining to dosage forms compoundinng and able to utilize pharmacopoeiae as standards
CO3	Design and dispense different dosage form
CO4	Identify and resolve incompatibilities in various dosage forms including liquid dosage forms and suppositories.

UNIT I

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.

UNIT II

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.

UNIT III

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.

UNIT IV

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.

UNIT V

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.

Text books & Reference books
1. Cooper and Gunns Dispensing for pharmacy students. 2. A text book Professional Pharmacy by N.K.Jain and S.N.Sharma. 3. Introduction to Pharmaceutical dosage forms by Howard C. Ansel. 4. Remington's Pharmaceutical Sciences. 5. Register of General Pharmacy by Cooper and Gunn. 6. General Pharmacy by M.L.Schroff.

Course Code	PHARMACEUTICS LAB	L	T	P	MARKS
24PHD102P		0	0	3	100

Course Category	Core Course

Course Objective

Course Outcomes

CO1	Work with the formula for the compounding of a dosage form.
CO2	Compound various types of dosage forms, select of suitable container for a dosage form, label the dosage form suitably with specific directions to the patient.
CO3	Know special conditions for storing a dosage form.
CO4	Predict the practical problems that arise while compounding a dosage form with respect to theory.

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	**03hrs**	**04hrs**

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

Course Code	MEDICINAL BIOCHEMISTRY	L	T	P	MARKS
24PHD103T		3	1	-	100

Course Category	Core Course

Course Objective

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.

Course Outcomes

CO1	Understand the basic concepts of Medicinal biochemistry and apply their biological significance
CO2	Understand the knowledge of metabolism and metabolic disorders
CO3	To know the significance of biological oxidation, protien and Nucleic metabolism
CO4	Understand the clinical chemistry of liver and kidney and its function
CO5	Gain the knowledge on immunochemical techniques, endocrine function and role of electrolytes

UNIT I

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.

UNIT II

i) Carbohydrate metabolism: Glycolysis, Citric acid cycle (TCA cycle), HMP shunt, Glycogenolysis, gluconeogenesis, glycogenesis. Metabolic disorders ofcarbohydrate 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 andketolysis; biosynthesis of fatty acids, lipids; metabolism of cholesterol; Hormonal regulation of lipid metabolism. Defective metabolism of lipids (Atheroslerosis, fatty liver, hypercholesterolmiea).

UNIT III

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;

ii) 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.

iii) 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.

UNIT IV

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.

UNIT V

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.

Text books & Reference books

1. Harpers review of biochemistry - Martin
2. Text book of biochemistry – D.Satyanarayana
3. Text book of clinical chemistry- Alex kaplan&LaverveL.Szabo
4. Principles of biochemistry -- Lehninger
5. Text book of biochemistry -- Ramarao
6. Practical Biochemistry-David T.Plummer.
7. Practical Biochemistry-Pattabhiraman.

Course Code	MEDICINAL BIOCHEMISTRY LAB	L	T	P	MARKS
24PHD103P		0	0	3	100

Course Category	Core Course
Course Objective	
Course Outcomes	
CO1	Qualitative analysis of constituents of urine and their estimation
CO2	Estimation of electrolyte constituents their significance
CO3	To know the importance of buffers and their biological role
CO4	Importance of serum constituents and their estimation

List of Experiments

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 LibermannBurchard'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	**03hrs**	**04hrs**

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

Course Code	PHARMACEUTICAL ORGANIC CHEMISTRY	L	T	P	MARKS
24PHD104T		3	1	-	100

Course Category	Core Course

Course Objective

This course is designed to impart a very good knowledge about IUPAC/Common system of nomenclature of simple organic compounds belonging to different classes of organic compounds, Some important physical properties of organic compounds; Free radical/ nucleophyllic [alkyl/ acyl/ aryl] /electrophyllic substitution, free radical/ nucleophyllic / electrophyllic addition, elimination, oxidation and reduction reactions with mechanism, orientation of the reaction, order of reactivity, stability of compounds; Some named organic reactions with mechanisms; and Methods of preparation, test for purity, principle involved in the assay, important medicinal uses of some important organic compounds.

Course Outcomes

CO1	To understand physicochemical properties and able to give Common and systematic names to simple organic compounds, bi/tri functional groups.
CO2	To draw the stereochemical, isomeric, chemical structures and synthesize simple pharmaceutically active organic compounds.
CO3	To achieve an understanding of the behavior of organic compounds and to establish a foundation for studies into natural and synthetic products of pharmaceutical interest.
CO4	To describe detailed mechanisms and applications for common,organic named reactions.
CO5	To understand redox reaction and reagents, reaction intermediates and special properties of pharmaceutically important organic compounds.

UNIT I

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.

UNIT II

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.

UNIT III

i) Theory of resonance: Allyl radical as a resonance hybrid, stability, orbital picture, resonance stabilisation of allyl radicals, hyper conjugation, allylcation asa 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 ofelimination, 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 halogenation of alkyl benzene, resonance stabilization of benzyl radical.

UNIT IV

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.

UNIT V

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.

Text books & Reference books

1. T.R.Morrison and R. Boyd - Organic chemistry,
2. Bentley and Driver-Text book of Pharmaceutical chemistry
3. I.L.Finer- Organic chemistry, the fundamentals of chemistry
4. Organic chemistry – J.M.Cram and D.J.Cram
5. Organic chemistry- Brown
6. Advanced organic chemistry- Jerry March, Wiley
7. Organic chemistry- Cram and Hammered, Pine Hendrickson

Course Code	PHARMACEUTICAL ORGANIC CHEMISTRY LAB	L	T	P	MARKS
24PHD104P		0	0	3	100

Course Category	Core Course
Course Objective	
Course Outcomes	
CO1	To acquire the knowledge and understanding of the basic experimental principles of pharmaceutical organic chemistry.
CO2	To be able to run experimental techniques, procedures and safe laboratory practices.

List of Experiments

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	**03hrs**	**04hrs**

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

Course Code	PHARMACEUTICAL INORGANIC CHEMISTRY	L	T	P	MARKS
24PHD105T		2	1	-	100

Course Category	Core Course

Course Objective

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.

Course Outcomes

CO1	Understand the types and determination of errors involved in quantitative analysis.
CO2	Understand the importance of different pharmacopoeias and application of monograph data in the evaluation of qualitative and quantitative parameters of various inorganic medicinal substances.
CO3	Understand the underlying principles, procedures of different volumetric methods of analysis and their intended application in quantitative estimation of different inorganic medicinal substances
CO4	Categorize different inorganic medicinal substances based on their therapeutic uses and enlist their preparation, assay and test for purity.
CO5	Understand the concept of radio isotopes and their application in pharmaceuticals

UNIT I

A. Errors
B. Volumetric analysis
C. Acid-base titrations
D. Redox titrations

UNIT II

A. Non aqueous titrations
B. Precipitation titrations
C. Complexometric titrations
D. Theory of indicators

UNIT III

A. Gravimetry
B. Limit tests
C. Medicinal gases
D. Acidifiers

UNIT IV

A. Antacids
B. Cathartics
C. Electrolyte replenishers
D. Essential Trace elements

UNIT V

A. Antimicrobials
B. Pharmaceutical aids

C. Dental Products

D .Miscellaneous compounds

E. Radio Pharmaceuticals

Text books & Reference books

1. A text book Inorganic medicinal chemistry by Surendra N. Pandeya
2. A.H. Beckett and J. B. Stanlake's Practical Pharmaceutical chemistry Vol-I &Vol-II
3. Inorganic Pharmaceutical Chemistry III-Edition P.Gundu Rao
4. Inorganic Pharmaceutical Chemistry by Anand&Chetwal
5. Pharmaceutical Inorganic chemistry by Dr.B.G.Nagavi
6. Analytical chemistry principles by John H. Kennedy d. I.P.1985 and 1996, Govt. of India, Ministry of health

Course Code	PHARMACEUTICAL INORGANIC CHEMISTRY LAB	L	T	P	MARKS
24PHD105P		0	0	3	100

Course Category	Core Course
Course Objective	
Course Outcomes	
CO1	To acquire the knowledge and understanding of the basic experimental principles of pharmaceutical organic chemistry.To be able to run experimental techniques, procedures and safe laboratory practices.
CO2	Demonstrate the ability to identify and use relevant equipment, glassware, chemicals to perform various inorganic lab experiments by adopting laboratory safety protocol.
CO3	Perform limit test for chlorides, sulphates, and heavy metals as a tool to assess the purity of different pharmaceutical substances.
CO4	Apply the principles of volumetric analysis in quantitative estimations of different inorganic medicinal substances and assess their percentage purity.
CO5	Prepare and purify different inorganic medicinal compounds

List of Experiments

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 Experiment1&2	03	15
Viva	02	15
Max Marks	**20**	**70**
Duration	**03hrs**	**04hrs**

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

Course Code	REMEDIAL MATHEMATICS/BIOLOGY	L	T	P	MARKS
24PHD106T		3	1	-	100

Course Category	Core Course

Course Objective

REMEDIAL MATHEMATICS: This is an introductory course in mathematics. This subjects deals with the introduction to matrices, determinants, trigonometry, analytical geometry, differential calculus, integral calculus, differential equations, laplace transform.

BIOLOGY: 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.

Course Outcomes - REMEDIAL MATHEMATICS	
CO1	To Know Trignometry, Analytical geometry, Matrices, Determinant, Integration, Differential equation, Laplace transform and their applications;
CO2	To solve the problems of different types by applying theory
CO3	To appreciate the important applications of mathematics in pharmacy.
Course Outcomes – BIOLOGY	
CO1	Gain knowledge about history, sources, classification, distribution and identification of plants and animals
CO2	Gain knowledge about various systems of plants and animals

REMEDIAL MATHEMATICS

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

BIOLOGY

UNIT I		
Introduction General organization of plants and its inclusions Plant tissues Plant kingdom and its classification Morphology of plants Root, Stem, Leaf and Its modifications		
UNIT II		
Inflorescence and Pollination of flowers Morphology of fruits and seeds Plant physiology		
UNIT III		
Taxonomy of Leguminosae, umbelliferae, Solanaceae, Lilliaceae, Zinziberaceae, Rubiaceae Study of Fungi, Yeast, Penicillin and Bacteria		
UNIT IV		
Study of Animal cell Study animal tissues Detailed study of frog		
UNIT V		
Study of Pisces, Raptiles, Aves Genearal organization of mammals Study of poisonous animals		

Text books & Reference books

REMEDIAL MATHEMATICS

1. Differential calculus By Shantinarayan
2. Text book of Mathematics for second year pre- university by Prof.B.M.Sreenivas
3. Integral calculus By Shanthinarayan
4. Engineering mathematics By B.S.Grewal
5. Trigonometry Part-I By S.L.Loney

BIOLOGY

1. Text book of Biology by S.B.Gokhale
2. A Text book of Biology by Dr.Thulajappa and Dr.Seetaram.
3. A Text book of Biology by B.V.Sreenivasa Naidu
4. A Text book of Biology by Naidu and Murthy
5. Botany for Degree students By A.C.Dutta.
6. Outlines of Zoology by M.Ekambaranathaayyer and T.N.Ananthakrishnan.
7. A manual for pharmaceutical biology practical by S.B.Gokhale and C.K.Kokate.

Course Code	BIOLOGY LAB	L	T	P	MARKS
24PHD106P		0	0	3	100

Course Category	Core Course
Course Objective	
Course Outcomes	
CO1	Gain knowledge about history, sources, classification, distribution and identification of plants and animals
CO2	Gain knowledge about various systems of plants and animals

List of Experiments	
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

*Biology

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**	**01**

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

Course Code	HUMAN VALUES & PROFESSIONAL ETHICS (AUDIT COURSE) (THEORY)	L	T	P	MARKS
24PHDA01T		2	-	-	30

Course Category	Core Course

Course Objective

This course is designed to impart a thorough knowledge of the human values and professional ethics to make aware the students on various issues concerning man and society and educate and make the young generation students aware of their social responsibilities. This helps the students in understanding the basics regarding the leadership and to become a conscious professionals.

UNIT I		

Indian Society: Structure of Indian Society, Indian Social Demography, Indian constitution

UNIT II		

Social Development: Scientific approach to the study of human beings. Evolution of human kind, social change and evolution. Industrial revolution. National policy on education, health and health care and human development.

UNIT III		

Human Values : Morals, values and Ethics, Integrity, Work ethic, Civic virtue , Valuing time, Cooperation, Commitment, Empathy, Self-confidence , stress management, Leadership qualities and Personality development.

UNIT IV		

Research Ethics and Codes of Ethics: Ethical code and its importance, ethical accountability

UNIT V		

Ethics and professions: Ethical values, standard and practices concerning the legal profession, medicine, etc. Ethics at the workplace: - cybercrime, plagiarism, fraudulent use of institutional resources, Dressing Etiquettes, etc.

Text books & Reference books

1. A Textbook on Professional Ethics and Human Values by R S Naagarazan
2. Human Values And Professional Ethics by Vaishali R Khosla, Kavita Bhagat
3. Indian Society and Social Institutions by N Jayapalan
4. The Indian Economy Since 1991 by BA Prakash