KL College of Pharmacy

Koneru Lakshmaiah Education Foundation (Deemed to be University)

MASTER OF PHARMACY

Pharmaceutics

PROGRAM HANDBOOK 2026

For students admitted in academic year 2026-27

Syllabus as prescribed by the Pharmacy Council of India

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Vision & Mission

VISION

Lead the future of global healthcare and well-being of the communities we serve.

MISSION

Education:

Provide the most comprehensive and highest quality education for pharmaceutical sciences in a learning environment that embraces diversity, equity, integrity, ethics, moral courage and accountability.

Community service:

Conduct health education programs to the community to prevent disease and improve public health and wellness by fostering an environment that promotes the safe, efficacious, and cost-effective use of medications.

Research:

Develop a passion for discovery and innovations with multidisciplinary collaborative research and engage in creative partnerships locally and globally to advance health education, research, and practice.

Entrepreneurship:

Encourage and support resourcefulness, originality, imagination, ingenuity, and vision in our students, faculty, and staff. Foster the development of entrepreneurs who have the ability to dream, inspire and innovate and courage to envisage the commercial success and socio economic productivity of innovations. Program Handbook

Programme Outcomes

Programme Educational Objectives

PEO	Description
1	Knowledge & Understanding: To showcase the knowledge of pharmaceuticals, medication use and their safety and effectiveness.
2	Skill: To demonstrate their skills in providing quality pharmaceuticals, drug information and therapy including legal and ethical aspects.
3	Attitude: To evaluate technological advancements, continuously update professional knowledge, and actively participate in the implementation of national health programmes.

Programme Outcomes & Programme Specific Outcomes

PO / PSO	Description
PO1	Advanced Pharmaceutical Knowledge: Apply core and emerging concepts of pharmaceutical sciences to develop, evaluate, and optimize innovative drug formulations, delivery systems, and therapeutic strategies.
PO2	Research Competence and Innovation: Design and execute independent and collaborative research projects using advanced experimental techniques, analytical tools, and data interpretation methods to address contemporary pharmaceutical challenges.
PO3	Regulatory and Ethical Proficiency: Demonstrate in-depth understanding of regulatory frameworks, quality systems (GMP, GLP, ICH guidelines), and uphold ethical standards in academic, industrial, and clinical research environments.
PO4	Technology Integration and Problem Solving: Utilize modern instruments, software, and digital technologies including QbD, computational modeling, and automation to analyze complex pharmaceutical problems and propose evidence-based solutions.
PSO1	To equip students with knowledge and skills in formulation design, product development, in vitro and biopharmaceutical evaluation, and optimization techniques to achieve improved therapeutic efficacy.
PSO2	To engage in research and promote entrepreneurial initiatives that address the needs of the healthcare sector and benefit society.

Credit Requirements

No flexibility with no add-on. Total credits required: 97.

Category	Sub-category	Min credits	Max credits	Min courses	Max courses
PCC	PCC-CORE	48.0	48.0	11	11
SDC	SDC-CORE	19.0	19.0	7	7
PRI	PRI-CORE	30.0	30.0	2	2
VAC	VAC-CERT	0.0	0.0	1	1
AUC	AUC-CAREER	0.0	0.0	1	1
Total		**97**			

Outcome requirement

- Have obtained a minimum CGPA of 5.0 at the end of the program.
- Must have finished all the above-mentioned requirements in less than twice the period of the program, which includes deceleration period chosen by the student, deceleration imposed by KLEF or debarred from the KLEF.

Programme Structure

Semester I

Code	Course	Cat	L	T	P	S	Cr	Hrs
26PY5101	MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES	PCC	4	0	0	0	4	4
26PY5102	DRUG DELIVERY SYSTEMS	PCC	4	0	0	0	4	4
26PY5103	MODERN PHARMACEUTICS	PCC	4	0	0	0	4	4
26PY5104	REGULATORY AFFAIR	PCC	4	0	0	0	4	4
26PY5105	PHARMACEUTICS PRACTICAL I	PCC	0	0	12	0	6	12
26PY5106	SEMINAR/ASSIGNMENT	SDC	0	0	8	0	4	8
	Total						**26**	**36**

Semester II

Code	Course	Cat	L	T	P	S	Cr	Hrs
26PY5107	MOLECULAR PHARMACEUTICS	PCC	4	0	0	0	4	4
26PY5108	ADVANCED BIOPHARMACEUTICS AND PHARMACOKINETICS	PCC	4	0	0	0	4	4
26PY5109	COMPUTER AIDED DRUG DELIVERY SYSTEM	PCC	4	0	0	0	4	4
26PY5110	COSMETIC AND COSMECEUTICALS	PCC	4	0	0	0	4	4
26PY5111	PHARMACEUTICS PRACTICAL II	PCC	0	0	12	0	6	12
26PY5112	SEMINAR/ASSIGNMENT	SDC	0	0	8	0	4	8
	Total						**26**	**36**

Semester III

Code	Course	Cat	L	T	P	S	Cr	Hrs
26PY5113	RESEARCH METHODOLOGY AND BIOSTATISTICS	PCC	4	0	0	0	4	4
26PY5114	JOURNAL CLUB	SDC	0	0	2	0	1	2
26PY5115	DISCUSSION / PRESENTATION (PROPOSAL PRESENTATION)	SDC	0	0	4	0	2	4
26PY5116	RESERCH WORK	PRI	0	0	28	0	14	28
	Total						**21**	**38**

Semester IV

Code	Course	Cat	L	T	P	S	Cr	Hrs
26PY5117	JOURNAL CLUB	SDC	0	0	2	0	1	2
26PY5118	RESERCH WORK	PRI	0	0	32	0	16	32
26PY5119	DISCUSSION/FINAL PRESENTATION	SDC	0	0	6	0	3	6
	Total						**20**	**40**

Programme-wide

Code	Course	Cat	L	T	P	S	Cr	Hrs
26PY5120	CO-CURRICULAR ACTIVITIES (ATTENDING CONFERENCE, SCIENTIFIC PRESENTATIONS AND OTHER SCHOLARLY ACTIVITIES)	SDC	0	0	8	0	4	8
	Total						**4**	**8**

Value added & audit courses (zero credit)

Code	Course	Cat	S	Hrs
26CC3016	BASE SAS	VAC	8	8
26CC3069	PHARMACOVIGILANCE	VAC	8	8
26CC3077	REGULATORY AFFAIRS	VAC	8	8
CADCOML1V1	CAREER ADVANCEMENT:COMPETITIVE EXAM TRAINING	AUC	8	8
CADCORL1V1	CAREER ADVANCEMENT: TRAINING IN CORE DOMAIN	AUC	8	8
CADENTL1V1	CAREER ADVANCEMENT:ENTREPRENEURIAL CAREER PATHWAY TRAINING	AUC	8	8
CADUPSL1V1	CAREER ADVANCEMENT: UPSC-CIVIL SERVICES EXAM TRAINING	AUC	8	8
CRTCODL1V1	CAMPUS RECRUITMENT: LOGIC BUILDING SKILLS TRAINING	AUC	8	8
CRTCSSL1V1	CAMPUS RECRUITMENT: COMMUNICATION SKILLS TRAINING	AUC	8	8
CRTCSSL2V2	CAMPUS RECRUITMENT: SOFT SKILLS TRAINING	AUC	8	8
CRTVQRL1V1	CAMPUS RECRUITMENT: VERBAL APTITUDE TRAINING	AUC	8	8
CRTVQRL2V2	CAMPUS RECRUITMENT: QUANTITATIVE APTITUDE TRAINING	AUC	8	8
CRTVQRL3V3	CAMPUS RECRUITMENT: REASONING APTITUDE TRAINING	AUC	8	8

Programme Articulation Matrix

Course	CO	Description	BTL	PO1	PO2	PO3	PO4	PSO1	PSO2
26PY5101	CO1	Investigation, Characterization and quantification of organic compounds using analytical instruments	2	3	2	-	-	2	-
	CO2	Investigate and determine the structure of typical organic chemical compounds using NMR spectroscopy	3	3	2	-	-	2	-
	CO3	Investigate and determine the structure of typical organic chemical compounds using MS spectrometry	3	3	2	-	-	2	-
	CO4	Understand the isolation, purification and quantification of typical organic chemical compounds using chromatography techniques	2	3	2	-	-	2	-
	CO5	Understand the concepts of electrophoresis and radio-immuno assays	2	2	2	-	-	2	-
	CO6	Investigate and determine the structure of typical chemical compounds using X-Ray Diffraction methods	3	2	2	-	-	2	-
26PY5102	CO1	Understand the process of pilot plant and scale up of pharmaceutical dosage forms	2	2	2	-	-	2	-
	CO2	Understand about suitable drugs and polymers for specific controlled drug delivery systems and discuss modern strategies	2	2	2	-	-	2	-
	CO3	Understand various approaches for rate controlled and ocular drug delivery systems	2	2	2	-	-	-	2
	CO4	Understand the formulation concepts involved in development of GRDDS, buccal and transdermal DDS	2	2	2	-	-	2	-
	CO5	Apply the evaluation of buccal and transdermal DDs	3	2	3	-	-	3	-
	CO6	Apply novel strategies in delivery of biosimilars like proteins, peptides and vaccines	3	2	3	-	-	3	-
26PY5103	CO1	understand various preformulation concepts in dosage form Development	2	2	-	-	-	3	-
	CO2	Understand new dosage forms by applying the principles of optimization.	2	-	2	-	-	3	-
	CO3	understand validation protocol for solid and liquid dosage forms.	2	-	2	-	-	3	-
	CO4	Apply the cGMP and Industrial management principles in dosage form development	3	-	2	-	-	3	-
	CO5	Understand the process of compaction and compression in solid dosage form development	2	2	-	-	-	3	-
	CO6	Understand the study of consildation parameter	2	2	-	-	-	3	-
26PY5104	CO1	Understand the concepts of innovator and generic drugs in drug development process	2	2	-	2	-	2	-
	CO2	Understand Regulatory requirements for new drug application approval in pharmaceuticals	2	2	-	2	-	2	-
	CO3	Understand ICH guidelines for filing and approval process of drug products in different countries	2	2	-	2	-	2	-
	CO4	Illustrate the post approval regulatory requirements for products and submission of global documents in Common Technical Document/ eCTD formats	3	3	-	3	-	3	-

Course	CO	Description	BTL	PO1	PO2	PO3	PO4	PSO1	PSO2
	CO5	Illustrate the regulatory procedures involved in non-clinical and clinical drug development	3	3	-	3	-	3	-
	CO6	Apply the principles of regulatory affairs in drug development process, filing and approval, non-clinical and clinical drug development in global scenario	3	3	-	3	-	3	-
26PY5105	CO1	Analyse the Pharmacopoeial compounds and their formulations by various analytical techniques	4	3	-	-	3	-	3
	CO2	Preparation and evaluation of the different oral drug delivery systems	3	3	-	-	3	-	3
26PY5107	CO1	Understand the concepts involved in Drug targeting systems	2	-	2	-	-	-	2
	CO2	Understand the preparation and evaluation of targeting methods	2	-	2	-	-	-	2
	CO3	Design and develop various delivery systems for a specific drug target	3	-	2	-	-	-	2
	CO4	Understand the preparation and evaluation of Intra nasal formulations	2	-	3	-	-	-	2
	CO5	Understand the nucleic acid- based therapeutic drug delivery system	2	-	3	-	-	-	2
	CO6	Applications of the potential target diseases for gene therapy	3	-	3	-	-	-	2
26PY5108	CO1	Understand the mechanisms and factors affecting ADME processes through GIT	2	2	-	-	-	2	-
	CO2	Discuss several biopharmaceutic considerations, BCS, IVIVC and permeability in drug product design and in vitro drug product performance	2	2	-	-	-	2	-
	CO3	Understand the impact of drug interactions on drug action	2	2	-	-	-	2	-
	CO4	Explain the protocol for bioavailability/bioequivalence studies and their role in generic product development	2	2	-	-	-	2	-
	CO5	Illustrate the assessment of pharmacokinetic parameters assuming different models	3	2	-	-	-	2	-
	CO6	Illustrate the application of pharmacokinetic principles in development of drug products and biosimilars	3	2	-	-	-	2	-
26PY5109	CO1	Understand the history of computers in pharmaceutical research and development	2	3	-	-	3	-	-
	CO2	Understand computational modeling of drug disposition	2	3	-	-	3	-	-
	CO3	Apply the approaches of optimization techniques in pharmaceutical formulation	3	3	-	-	3	-	-
	CO4	Understand the importance of computers in biopharmaceutical characterization	2	3	-	-	3	-	-
	CO5	Understand the role of computer simulations in PK-PD and clinical data management	2	3	-	-	3	-	-
	CO6	Illustrate the application of AI, robotics and CFD in pharmacy field	3	3	-	-	3	-	-
26PY5110	CO1	Understand the Regulatory provisions related to the import, manufacture and sale of cosmetics.	2	-	2	-	-	1	-
	CO2	Understand the diverse skin problems and how to overcome through skin preparations	2	-	2	-	-	1	-
	CO3	Understand the Formulation and evaluation of a variety of cosmetic products.	2	-	2	-	-	1	-
	CO4	Understanding the key ingredients and basic science to develop cosmetics and Cosmeceuticals.	2	-	2	-	-	1	-
	CO5	Understand the knowledge of the various technologies	2	-	2	-	-	1	-

Course	CO	Description	BTL	PO1	PO2	PO3	PO4	PSO1	PSO2
		involved in cosmetics manufacture.							
	CO6	Understand the Design of cosmeceuticals and herbal formulations .	2	-	2	-	-	1	-
26PY5111	CO1	Development and evaluation of different novel drug delivery systems by applying various computational tools	4	-	3	-	3	2	-
	CO2	Apply PK-PD simulation models in drug design and development, cosmeceuticals preparation	3	-	3	-	3	2	-
26PY5113	CO1	Understand the basic principles of research methodology and its role in pharmaceutical aspect	2	-	3	-	-	2	-
	CO2	Understand the basic concepts of biostatistics	2	-	3	-	-	2	-
	CO3	Illustrate the importance of biostatistics in research	3	-	3	-	-	2	-
	CO4	Develop research proposal following the principles of medical research	3	-	3	-	-	2	-
	CO5	Apply the guidelines of CPCSEA in preclinical experimentation	3	-	3	-	-	2	-
	CO6	Understand the principles of Declaration of Helsinki	2	-	3	-	-	2	-
26PY5106	CO1	Select topic from the course content for deep learning towards seminar presentation	2	-	-	-	Y	Y	-
	CO2	Develop advanced content and present it as seminar	2	-	-	-	Y	Y	-
	CO3	Select topic from the course content for deep learning towards assignment preparation	2	-	-	-	Y	Y	-
	CO4	Develop advanced content and present it as assignment	2	-	-	-	Y	Y	-
26PY5112	CO1	Select topic from the course content for deep learning towards seminar presentation	2	-	-	-	Y	Y	-
	CO2	Develop advanced content and present it as seminar	2	-	-	-	Y	Y	-
	CO3	Select topic from the course content for deep learning towards assignment preparation	2	-	-	-	Y	Y	-
	CO4	Develop advanced content and present it as assignment	2	-	-	-	Y	Y	-
26PY5114	CO1	Select a research paper published in reputed journal by using search engines and databases	2	-	Y	-	-	Y	-
	CO2	Critically appraise the published research work	2	-	Y	-	-	Y	-
	CO3	Develop a report	2	-	Y	-	-	Y	-
	CO4	Present the critical observations and discuss	2	-	Y	-	-	Y	-
26PY5115	CO1	Identify the research problem	2	-	Y	-	-	-	Y
	CO2	Discuss research problem with team, peers and guide for solution	2	-	Y	-	-	-	Y
	CO3	Develop a protocol report on the critically appraised research problem with aim and objectives	3	-	Y	-	-	-	Y
	CO4	Analyse and present the critically appraised research problem in appropriate form and discuss the plan of work	4	-	Y	-	-	-	Y
26PY5117	CO1	Select a research paper published in reputed journal by using search engines and databases	2	-	Y	-	Y	Y	-
	CO2	Critically appraise the published research work	2	-	Y	-	Y	Y	-
	CO3	Develop a report	2	-	Y	-	Y	Y	-
	CO4	Present the critical observations and discuss	2	-	Y	-	Y	Y	-
26PY5119	CO1	Interpret the observations and results	2	-	Y	-	-	-	Y

Course	CO	Description	BTL	PO1	PO2	PO3	PO4	PSO1	PSO2
	CO2	Develop the presentation in an organized manner	2	-	Y	-	-	-	Y
	CO3	Explain the followed methods and results	4	-	Y	-	-	-	Y
	CO4	Defend the questions from experts and peers	4	-	Y	-	-	-	Y
26PY5120	CO1	Apply for external scientific/technical programs like conferences/seminars/symposia, Present their technical or research work	3	-	Y	-	Y	-	-
	CO2	Application of skills in presenting their technical or research work	3	-	Y	-	Y	-	-
	CO3	Application of various tools and software in writing scientific papers, articles and presentations	3	-	Y	-	Y	-	-
	CO4	Apply team management tasks and networking	3	-	Y	-	Y	-	-
26PY5116	CO1	Review the latest literature in selected area of work	2	-	2	-	2	-	2
	CO2	Conduct research experiments to meet the aim and objectives of proposed research work	4	-	2	-	2	-	3
	CO3	Evaluate the findings and plan alterations or new methodologies or procedures for further improvement	5	-	2	-	2	-	3
	CO4	Document the findings of conducted experiments	2	-	2	-	2	-	3
	CO5	Interpret the results obtained and summarize the work with a conclusion	4	-	2	-	2	-	2
	CO6	I Interpret the results obtained and summarize the work with a conclusion	2	-	2	-	2	-	2
26PY5118	CO1	Review the latest literature in selected area of work	2	-	2	-	2	-	2
	CO2	Conduct research experiments to meet the aim and objectives of proposed research work	4	-	2	-	2	-	3
	CO3	Evaluate the findings and plan alterations or new methodologies or procedures for further improvement	5	-	2	-	2	-	3
	CO4	Document the findings of conducted experiments	2	-	2	-	2	-	2
	CO5	Interpret the results obtained and summarize the work with a conclusion	4	-	2	-	2	-	2
	CO6	Interpret the results obtained and summarize the work with a conclusion	2	-	2	-	2	-	2
26CC3016	CO1	Apply the role of SAS Programming for Biotechnology	3	-	Y	-	Y	-	-
	CO2	Apply the concepts of SAS Programming for Biotechnology Applications	3	-	Y	-	Y	-	-
26CC3069	CO1	Apply pharmacovigilance principles and methodologies to monitor and assess the safety of pharmaceutical products throughout their lifecycle, implementing the foundational principles of pharmacovigilance	3	-	-	Y	Y	-	-
	CO2	Apply the concept of adverse drug reactions (ADRs) and assess their potential impact on public health, regulatory decisions, and patient care, nature, classification, and evaluation of adverse drug reactions (ADRs).	3	-	-	Y	Y	-	-
26CC3077	CO1	Apply the roles and functions of major regulatory agencies	3	-	-	Y	Y	-	-
	CO2	Apply the regulatory environment and key legislation that governs pharmaceuticals, biologics, and medical devices	3	-	-	Y	Y	-	-
	CO3	Apply the concepts of quality control and assurance processes to ensure trial integrity and compliance	3	-	-	Y	Y	-	-
CADCOML1V1	CO1	Enhance critical thinking and problem-solving skills to analyze and solve complex problems effectively.	3	-	-	-	Y	-	-
	CO2	Apply strategic test-taking techniques to improve performance	3	-	-	-	Y	-	-

Course	CO	Description	BTL	PO1	PO2	PO3	PO4	PSO1	PSO2
		and manage exam- related stress.							
CADCORL1V1	CO1	Apply advanced domain-specific concepts and emerging trends to address industry challenges and innovations.	3	Y	-	-	-	-	-
	CO2	Apply advanced problem-solving and strategic decision-making techniques to manage complex projects within the core domain.	3	Y	-	-	-	-	-
CADENTL1V1	CO1	apply essential entrepreneurial qualities such as resilience, innovation, and risk- taking, enabling them to pursue entrepreneurial career paths in various contexts, including startups, corporate roles, and freelancing.	3	-	Y	-	-	-	-
	CO2	Develop the skills to recognize potential business opportunities, conduct thorough market research, and validate ideas by addressing customer needs and evaluating feasibility, preparing them to create sustainable business solutions.	3	-	Y	-	-	-	-
CADUPSL1V1	CO1	Understanding the basics of Indian History and it\'s evolution	2	-	-	Y	-	-	-
	CO2	Understanding the basics of Indian Geography	2	-	-	Y	-	-	-
	CO3	Understanding the Evolution of Indian Constitution.	2	-	-	Y	-	-	-
	CO4	Understanding the evolution of Indian Economy	2	-	-	Y	-	-	-
CRTCODL1V1	CO1	Apply logical principles and critical thinking skills to analyze and evaluate arguments, solve problems, and make informed decisions.	3	-	-	-	Y	-	-
	CO2	Identify various logical reasoning techniques to solve complex problems, identify patterns, and draw valid conclusions	3	-	-	-	Y	-	-
CRTCSSL1V1	CO1	apply knowledge of communication of different types and techniques while analyzing body language and tone to enhance overall communication effectiveness. apply active listening and feedback techniques, and analyzing effective participation	3	-	Y	-	-	-	-
	CO2	in group discussions, while exploring roles in teamwork and strategies for managing conflicts, alongside professional communication practices such as writing emails and conducting meetings.	3	-	Y	-	-	-	-
CRTCSSL2V2	CO1	applyi and practice empathy, critical thinking, problem-solving, decision-making, effective communication, and interpersonal skills through real-life scenarios and interactive activities.	3	-	-	-	Y	-	-
	CO2	apply group discussion techniques, interview skills, and mock interviews through practical exercises, encouraging learners to practice and refine these skills in realistic settings.	3	-	-	-	Y	-	-
CRTVQRL1V1	CO1	apply and practice grammatical concepts like sentence formation, identifying odd words, using one-word substitutions, while enhancing understanding of idioms, phrases, spellings, and structures.	3	-	-	-	Y	-	-
	CO2	apply concepts like paragraph formation, sentence completion, reading comprehension, sentence correction, and correcting jumbled sentences, while enhancing word selection and sentence structure accuracy.	3	-	-	-	Y	-	-
CRTVQRL2V2	CO1	Apply principles of quantitative techniques to solve problems on Simple Equations, Simple & Compound Interest etc	3	-	-	-	Y	-	-
	CO2	Apply principles of quantitative techniques to solve problems on Divisibility, Functions, Surds & Indices etc	3	-	-	-	Y	-	-
CRTVQRL3V3	CO1	Apply principles of deductive logic to solve problems on syllogisms, Venn diagrams, etc	3	-	-	-	Y	-	-
	CO2	Apply principles of inductive logic to solve problems on assumptions and conclusions	3	-	-	-	Y	-	-

Rules & Regulations

Admission Eligibility Criteria

A Pass in the following examinations a) B. Pharm Degree examination of an Indian university established by law in India from an institution approved by Pharmacy Council of India and has scored not less than 55 % of the maximum marks (aggregate of 4 years of B. Pharm.) b) Every student, selected for admission to post graduate pharmacy program in any PCI approved institution should have obtained registration with the State Pharmacy Council or should obtain the same within one month from the date of his/her admission, failing which the admission of the candidate shall be cancelled. Note: It is mandatory to submit a migration certificate obtained from the respective university where the candidate had passed his/her qualifying degree (B. Pharm.)

Program Structure and Curriculum

- For each academic program, the curriculum serves as a framework that specifies the credits, course category, codes, titles, and delivery methods (Lectures, Tutorials, Practice, Skills, Projects, Self-Study, Capstone Design, etc.) under the Choice-Based Credit System (CBCS). The curriculum is designed, implemented, and assessed following the Outcome-Based Education (OBE) framework.In designing the curriculum, we ensure the integration of key contemporary and traditional values by embedding Indian Knowledge Systems (IKS), Sustainable Development Goals (SDGs), and Design Thinking principles into courses at their inception.
- Each Academic Year consists of two regular semesters, each approximately 20 weeks including classwork and exams:
- Odd Semester: July to December
- Even Semester: December to May
- A Summer Term may be offered from May to June but is not considered a regular semester for calculating program duration.
- Students have the flexibility to choose courses as prescribed by KLEF.
- Each course has a Lecture-Tutorial-Practice-Skill (L-T-P-S)component.
- Course Credit Structure:
- Credits are allocated to courses based on the L-T-P-S structure:
- Every Lecture or Tutorial hour equals 1 credit.
- Every Practical hour equals 0.5 credits.
- Every Skill-based practice hour equals 0.25 credits.
- Course Precedence:
- The following are the guidelines for registering into courses with pre-requisites.
- A course may have one or more of its preceding course(s) as pre- requisite(s).
- To register for a course, the student must successfully be promoted in these course(s) earmarked as pre-requisite(s) for that course.

Registration Process

- Key Guidelines:
- Course Availability: Students are permitted to register only for courses offered in the specific semester of enrollment.
- Prerequisites: Any prerequisite courses must be successfully completed before registering for subsequent courses.
- Timely Registration: Students must register on the designated registration day. KLEF reserves the right to deny late registrations.
- Add/Drop/Change Period: Students have a one-week window from the start of classes to add a course and two-weeks to drop or change courses.
- Credit Limits:
- The recommended credit load is 22-24.

- The maximum credit load per semester is 30.
- If a student finds the standard load overwhelming, they can opt for deceleration, taking fewer courses now and making up the credits in a future summer semester.
- Students in honors programs or pursuing a minor may be allowed to take on a heavier load through overloading, subject to eligibility criteria.
- Elective Course Availability: KLEF may cancel elective courses with low enrollment within the first week. Students will be able to switch to another elective if they meet its prerequisites.
- Re-registration: If a student wants to improve their grade in a course, they can re-register for it with approval from the Dean of Academics.
- Registration Cancellation: KLEF can cancel a student's registration for disciplinary reasons or plagiarism.
- Timetable Clashes: Students are responsible for resolving any timetable conflicts. They should contact their Department Year Coordinator immediately if any clashes arise.
- Irregularities: If any irregularities are found in a student's registration later on, KLEF may cancel their registration for a course or even the entire semester.
- Registration Flexibilities:
- Choice of electives: Students have the flexibility to choose from a diverse set of elective courses that align with their personal interests or career objectives.
- Choice of faculty: Students have the flexibility to choose their preferred faculty members for certain courses, depending on departmental policies and course availability.
- Acceleration & Overloading: Students can accelerate their progress by taking courses from the next semester in advance, or overload by taking more credits than the standard limit. Prior permission from the Dean of Academics is required for either of these.
- Deceleration & Underloading: If students need to lighten their course load, they can decelerate by postponing some courses to the next semester, or underload by taking fewer credits than usual. Students who do not register on time, may also be forced to decelerate to compensate the classwork that they missed due to late registration. In both the cases of deceleration, permission must be sought from Office of Dean Academics through proper channel.
- Summer Term Registration:
- The Summer Term is designed to help students catch up or get ahead. Here are the guidelines:
- Eligibility: Students can register for summer courses if they have backlogs to clear, need to fulfill pre-requisites, or have been approved for acceleration.
- Credit Limit: The maximum credit load for the summer term is 12.
- Timetable Clashes: Students should ensure there are no conflicts in their summer course schedule.
- Attendance & Promotion: The same policies apply as in regular semesters, except that attendance condonation is not available in the summer.

Course Categories

Professional Core Courses (PCC): Professional Core Courses (PCC) are essential courses within each engineering discipline that provide foundational knowledge and skills critical to the field. These courses are integral to the curriculum and ensure that students acquire the core competencies necessary for their professional practice.

Skill Development Courses (SDC): Skill Development Courses are designed to equip students with practical, hands-on skills that enhance their employability and professional capabilities. These courses often focus on soft skills, technical proficiency, and industry-relevant competencies, such as communication, teamwork, leadership, digital literacy, and industry-specific software tools. By offering both theoretical knowledge and practical training, these courses help bridge the gap between academia and the professional world.

Project Research and Internship (PRI): Project Research and Internship courses provide students with real- world experience by engaging them in research projects and internships in industry or academia. These courses are essential for developing practical problem-solving skills, fostering innovation, and giving students the opportunity to apply the theoretical knowledge gained in the classroom to real-life scenarios. Through internships and research projects, students can gain industry exposure, improve their technical skills, and prepare themselves for professional careers or advanced studies.

Value-Added Courses (VAC): Value-Added Courses are designed to enhance employability by providing students with training that leads to globally recognized certifications or specialized skills. These courses focus on

industry-relevant knowledge and practical applications, ensuring students are well-prepared for current job market demands. By offering advanced skills and certifications, Value-Added Courses give students a competitive edge in their careers.

Audit Course (AUC): Audit courses are courses that students can attend without receiving a formal grade or credit towards their degree. These courses are often chosen by students who want to learn a subject for personal enrichment or to gain knowledge in areas outside of their major.

Requirements for the award of Degree

- To be eligible for the award of a M.Pharmacy. degree, a student must successfully fulfill the following criteria:
- Credit Requirements: Earn the minimum number of credits specified in the program structure.
- Focused Training: Successfully undertake specific training in focused areas that enable students to be successful in their chosen career tracks. The focused areas are: (a) Employment in MNCs, (b) Civil Services (c) Higher Studies (d) Research and (e) Entrepreneurship.
- Certifications: Successfully complete at least one global certification or value-added course in the chosen discipline.
- Audit Courses: Successfully complete all audit courses outlined in the program structure.
- Minimum CGPA: Achieve a minimum Cumulative Grade Point Average (CGPA) of 5.0 by the end of the program.
- Extra Courses: Students with extra courses having 'DT' or 'F' grades can still graduate if they meet all other requirements. However, these courses will be factored into the CGPA calculation.
- Time Limit: Complete all requirements within:
- A minimum of 4 regular semesters (excluding summer terms)
- A maximum of 4 years

Academic Bank of Credits

ABC helps the students to digitally store their academic credits from any higher education institute registered under ABC in order to award Certificate/Diploma/Degree/Honors based on the credits earned by the student.

All the credits acquired by the students are stored digitally by registering into Academic Bank of Credits (ABC) portal. It also supports retaining the credits for a shelf period and continue their program study with multiple breakovers.

Students may exit from their current program of study due to any unforeseen reasons or to focus on their chosen career path. In such cases, the student may break for a period of time (preferably not in the middle of an academic year) and may continue with the program of study at a later stage.

Students must be able to complete their program by not exceeding the maximum duration of the program. If not, they may be issued with a Certificate, diploma, degree or honors based on the credits acquired over the period of time for all the programs approved by UGC.

Award of Class

- A student having cleared all the courses and met all the requirements for the award of degree with
- Minimum of 5 CGPA is considered as Pass criteria for a student.
- CGPA of 5.00 to 5.99 will be awarded Second class.
- CGPA of 6.00 to 7.49 will be awarded First class.
- CGPA of 7.5 and above will be awarded First class with Distinction provided the student has cleared all the courses in first attempt a

Award of Medals

KLEF awards Gold and Silver medals to the top two candidates in each program after successful completion of their study. The medals are awarded based on their CGPA during the Annual Convocation with the following constraints:

The grade obtained through betterment/ supplementary will not be considered for this award.

He/She must have obtained first class with distinction for the award of Gold or Silver-medal.

Course Flexibilities

In line with the institution's commitment to personalized learning, courses are offered in multiple modes, allowing students to tailor their academic journey based on personal preferences, career goals, and learning styles. The available modes include:

Regular Mode: It is the traditional method of learning, involving in-person classroom instruction, a structured curriculum, and traditional assessments. This mode provides students with a structured and predictable learning environment, facilitating direct interaction with professors and classmates. It is suitable for students who prefer a traditional learning approach and value face-to-face interaction.

MOOCs Mode: Massive Open Online Courses (MOOCs) are utilized to support independent learners, such as students engaged in internships or practice school. Students can earn credits by completing accredited online courses at their own pace. Assessments in this mode may include online quizzes, certifications, and institutional evaluations.

Work-in-lieu Mode: It allows students to substitute certain coursework with relevant work experience, internships, or on-the-job training. Credits are awarded based on the work performed, and evaluations are typically centered around performance reports, supervisor evaluations, and reflective essays. This mode is ideal for students who want to gain practical experience while fulfilling academic requirements.

Attendance calculation in a course

Attendance calculation for LTPS: Attendance of a student on a course is calculated based on the credit-weighted average of the student's attendance in each of the LTPS components of the course.

Attendance start date: Attendance is counted from the class commencement date. However, for transferred or newly admitted students, attendance in their admitted semester is counted from the date of admission.

Attendance requirements leading to promotion

Minimum Attendance: 80% attendance is required for course promotion and appearing for the semester-end exam.

Condonation: Up to 10% condonation by Principal, College of Engineering, is possible for medical emergencies with proper documentation submitted within a week. Students will be levied a condonation fee to appear for the semester- end exam.

Marginal Cases: Attendance slightly below 70% due to severe medical or valid reasons may be considered for further relaxation by the condonation board appointed and headed by the Vice-Chancellor.

Attendance-based marks

Marks: Course coordinators can allocate up to 8% of the total marks for attendance for theory based courses and 10% of total marks for attendance for practical/skill based courses, clearly stated in the course handout and approved by the Dean of Academics through proper channel..

Mark Distribution: Marks are awarded based on attendance ranges: 95-100 is 8 marks, 90-94 is 6 marks, 85-89 is 4 marks, 80-84 is 2 marks and less than 80 is 0 mark. Further, for M. Pharm (Practical Courses) the distribution of marks, if the attendance percentage is 95-100 is 10 marks, 90-94 is 7.5 marks, 85-89 is 5 marks, 80-84 is 2.5 marks and less than 80 is 0 mark.

Applicability: Attendance marks, apply to all L-T-P-S components.

Attendance waiver

Eligibility: Students with a CGPA and SGPA of 9.00 or higher in the previous semester can get an attendance waiver for up to three courses in the next semester, with prior approval from the Dean of Academics through proper channel.

Conditions: Students using the attendance waiver can participate in all assessments and evaluation components without being marked ineligible due to attendance-based regulations.

Compensatory (Extra) attendance policy

Eligibility: Students representing KLEF in events or participating in co-curricular / extracurricular activities can get compensatory attendance with prior written approval.

Limit: Compensation is limited to 10% of total classes per course per semester and doesn't apply to the summer term.

Course-based promotion and detention policy

Minimum Attendance: Students must meet the minimum attendance requirement to be promoted in a course. If a student fails to meet this requirement, their grade in the course will be marked as "DT", indicating that the student is detained in the course.

Next Steps after detention: Student must re-register in a detained course and study it completely by attending the classwork, submitting all assessments, taking all evaluation components

Eligibility for appearing Sem-End Examination

- A Student registered for a course and got promoted is eligible to write the Semester End Examination for that course unless found ineligible due to one or more of the following reasons:
- Shortfall of attendance.
- Acts of indiscipline.
- Withdrawal from a course.
- Non-payment of examination fees.
- Without a hall ticket.

Assessment & Evaluation

- The assessment in each theory subject consists of Sem In Exams, in class quizzes/tutorials/home-assignments/Active Learning Methods (continuous assessment) and the Semester End Exanimation (SEE). Students are advised to refer to the course handout to get more detailed information on assessment.
- Sem In Examinations and the Semester End Examinations will be conducted as per the Academic Calendar.
- As per the necessity, the Supplementary examinations will be conducted at the discretion of Dean Academics with the approval of the Vice Chancellor.
- Students may have to take more than one examination in a day during Sem In exams, Semester End Examinations /Supplementary examinations.
- Minimum Semester-In Evaluation Sem End Examination requirement for pass College / School Name percent (Weightage in percent) (A) (Weightage in percent) (B) (A+B) B
- College of Pharmacy 25 75 50 25

Semester-In Evaluation

The following guidelines are followed for the Semester In evaluation.

The process of evaluation is continuous throughout the semester

The distribution of marks for Semester In evaluation is 25 percent of aggregate marks of the course.

The distribution of weightage for various evaluation components are decided and notified by the course coordinator through the course handout after approval by the Dean Academics, prior to the beginning of the semester.

In order to maintain transparency in evaluation, answer scripts are shown to the students for verification, within one week of conduct of exam. If there is any discrepancy in evaluation, the student can request the course coordinator to re-evaluate.

The solution key and scheme of evaluation for all examinations are displayed by the Course Coordinator in the appropriate web portal of the course, on the day of the conduct of examination.

In case the student is unable to appear for any evaluation component owing to hospitalization, participation in extra/ co-curricular activities representing KLEF/ state/ country; the Dean Academics can permit to conduct of re-examination for such students.

In case a student has missed any of the two in semester evaluations, S/he is eligible for and will be provided with an opportunity of appearing for re-examination.

The pattern and duration of such examination are decided and notified by the Course Coordinator through the Course handout, after approval from the Dean Academic.

To maintain transparency in evaluation, answer scripts are shown to the students for verification. If there is any discrepancy in evaluation, the student can request the Controller of Examinations to re-evaluate.

If a student earns F grade in any of the courses of a semester, an instant supplementary exam (for only Semester End Exam component) will be provided within a fortnight of the declaration of the results.

Semester-End Evaluation

The following guidelines are followed for the End Semester evaluation.

The end-semester evaluation typically includes a variety of components such as Sem End Exams, projects, presentations, or practical assessments, skill assessments as detailed in the course handout.

Each component is evaluated based on the criteria outlined in the course handout.

The distribution of weightage for various evaluation components are decided and notified by the course coordinator through the course handout after approval by the Dean Academics, prior to the beginning of the semester.

To pass in a course, student must meet or exceed the minimum passing marks specified for each end semester summative assessment component mentioned in the course handout.

The key and scheme of evaluation for all examinations are displayed by the Course Coordinator in the appropriate web portal of the course, on the day of the conduct of examination.

In case the student is unable to appear for any Sem end summative evaluation component owing to hospitalization, participation in extra/ co-curricular activities representing KLEF/ state/ country; student can request for re-examination by taking prior permission from Dean Academics.

If a student earns F grade in any of the courses of a semester, an instant supplementary exam (for only Semester End Exam component) will be provided within a fortnight of the declaration of the results.

Absence in Assessment and Examination

If a student misses a formative assessment component (quizzes, assignments, etc.) due to illness or other valid reasons, no retakes will be permitted, and a score of zero will be recorded. However, in cases of an excused absence, the instructor may allow the student to retake the assessment, subject to written approval from both the Principal and the relevant Head of Department. Make-up Exams: A student's absence from Semester In or Semester End Exams will only be considered for a make-up exam under the following circumstances.

Pre-approved participation in university/state/national/international co-curricular or extracurricular activities.

Illness or medical emergencies resulting in hospitalization, with a doctor's certification explicitly stating the student's inability to attend the exam within the designated period.

Death of an immediate family member.

Remedial Exams:

Remedial exams are conducted for students who score less than 60% on Semester In Exam I and have attended at least 85% of the remedial classes.

For courses without remedial classes, no remedial exam will be scheduled.

If a student does not take or scores less than 60% on Semester In Exam I, they must attend remedial classes and maintain a minimum 85% attendance to be eligible for the remedial exam. The remedial exam score will then be considered.

The number of remedial classes will be 33% of the regular classes held prior to Semester In Exam I. However, there are no remedial exams for Semester In Exam II or laboratory exams.

Remedial Classes Policy

- The following categories of students are recommended to attend Remedial classes:
- Students who did not attend or obtain a minimum of 60 percent marks in the Sem In exam1.
- Students for whom CO1/CO2 is (are) not attained in Sem In Exam 1
- Any other student may also be permitted to attend remedial classes as per the discretion of the principal.
- The following are the guidelines to conduct remedial classes:
- Remedial classes which are scheduled to be conducted usually one or two weeks post conclusion of Sem In exam1.
- The number of remedial classes to be conducted shall be 33 percent of regular classes held till the Sem In exam I.
- Remedial classes MUST NOT be scheduled during regular class work hours.

Assessment of Project/Research based Courses

- All project or research-based subjects must have a defined time limit for completion.
- The specific time limits for completion and schedule for monitoring and evaluation of performance of students will be announced each term.
- The final project report, after getting the plagiarism certificate, only will be considered and evaluated by the panel of examiners.
- Student project reports must follow the guidelines prescribed by the office of Dean Academics.

Grading Process

At the end of all evaluation components based on the performance of the student, each student is awarded based on absolute grading system.

Absolute Grading: The list of absolute grades and its connotation are given below:

Course handout

- A course handout is a document that provides essential information about a specific course. It's like a roadmap that guides you through the course, helping you understand the expectations, assignments, and grading criteria. Significance of Course Handout:
- Clarity and Organization: Course handouts help you stay organized and focused by outlining the course structure, topics, and deadlines.
- Expectations: They communicate the instructor's expectations for your participation, assignments, and overall performance.
- Grading: Course handouts outline the grading criteria, so you know exactly how your work will be evaluated.
- Resources: They often list valuable resources, such as textbooks, articles, or online tools, that can aid your learning.
- Expectations from the course handout:
- Course Description: A brief overview of the course, its goals, and its relevance to your studies.
- Learning Outcomes: Clear goals for what you should be able to do by the end of the course. These outcomes will help you understand the skills and knowledge that are expected to gain.
- Instructor Information: Contact details, office hours, and specific communication preferences.
- Course Schedule: A tentative timeline of topics, assignments, and exams.
- Required Materials: A list of textbooks, articles, or other materials essential for the course.
- Assessment Methods: A breakdown of how your final grade will be determined, including the weight of assignments, exams, and participation.
- Assignment Guidelines: Detailed instructions for each assignment, including due dates, submission requirements, and expectations.
- Effective use of the course handout:
- Refer to it regularly: Check back to keep track of important dates and assignments.
- Highlight key points: Make notes or highlight sections that are particularly important to you.
- Ask questions: If something isn't clear, bring it up in class or during office hours.

Betterment

A student may reappear for the semester-end examination for betterment, only in the theory part of a course to improve their grade, provided that the student has passed the course, his/her CGPA is less than or equal to 6.75 and the grade in the respective course is equal to or lower than a 'D'. In case of reappearing for a course, the best of the two grades will be considered.

A student may re-register for any course in any semester during the program to improve their grade if the current grade in the course is lower than 'C', with the approval of the Dean Academics and in accordance with academic regulations.

A student cannot reappear for the semester-end examination in courses with an L-T-P-S structure such as 0-0-X-X, 0-0-X-0, 0-0-0-X, Social Internship, Technical Internship, Seminar, Term Paper, Project, Capstone Project, Practice School, Industrial Internship.

Supplementary

A student is eligible for a supplementary exam if they don't meet the minimum passing marks for a course or if they fail any component of the end-of-semester assessments listed in the course handout.

If a student has failed courses from a previous odd semester that are not offered in the current semester, the supplementary exams for those courses will be scheduled for the summer supply.

As per the end semester assessment components listed in the course handout (i.e. end semester summative) if student fail any component, they are eligible for a supplementary exam. Only the component(s) student failed will be considered for this supplementary attempt, though in some cases, you might be allowed to retake all components to improve your marks.

In cases where there is a clash between supplementary exams and other scheduled exams, students may take the supplementary exams during the summer supply.

If a student fails any of the end-of-semester examinations in an even semester, supplementary exams will be scheduled either within one month after the release of the results (i.e. summer supply) or during the summer term.

Student must register for supplementary exams within a specified period after the results are declared.

Student may be required to pay a supplementary exam fee. Details on the fee structure and payment process will be provided along with the supplementary exam notification.

A student is not eligible for the award of a degree with first class with Distinction, if they opt for the Supplementary option.

Revaluation

Students desirous of seeing their Semester End Examination answer scripts have to apply online to the COE for the same within the timeframe as declared by the COE by paying the prescribed fee through ERP.

There is no provision for re evaluation in case of Lab/Practical/skilling exams, project, viva voce exam or seminar / design / mini project courses.

The final grades awarded to each course shall be announced by the COE and the same will be made available to students through the website/notice boards.

Credit Transfer

Credit transfer between KLEF and other Institution:

Credit transfer from KLEF to other institutions: Student studying in KLEF can take transfer to another institution under the following conditions:

KLEF has signed MOU with the institution

However, a student, after seeking transfer from KLEF can return to KLEF after a semester or year. Based on courses done in the other institution, equivalent credits shall be awarded to such students.

Credit transfer from another institution to KLEF:

A student studying in another institution can take transfer to KLEF under the following conditions:

When a student seeks transfer, equivalent credits will be assigned to the student based on the courses studied by the student.

To determine the equivalent credits for a course from a previous institution on a 10-point scale at KLEF, the number of credits of the course is multiplied by the equivalent grade point of the previous institution and then divided by the number of credits of the corresponding course at KLEF.

If a course from the previous institution has zero credits and no grade assigned, the student must sit for the final examination for the equivalent course at KLEF.

A transfer student seeking improvement in any course can take the final examination at KLEF, where the grade received at KLEF becomes the final grade recorded on their grade sheets.

The student, when transferred from other institutions, must stick to the rules and regulations of KLEF.

To graduate from KLEF, a student must study at least half of the minimum duration prescribed for a program at KLEF.

Credit Transfer Through MOOCs:

Undergraduate students can get credits for MOOCs courses recommended by KLEF up to a maximum of 20% of their minimum credits required for graduation. The discretion of allocation of MOOCs courses equivalent to the courses in the curriculum lies with the office of the Dean Academics.

A student may also be permitted to obtain 20 credits through MOOCs in addition to the minimum credits required for graduation. These 20 credits can also be utilized to acquire a Minor degree or an Honors degree if the courses are pronounced equivalent to those specified for the respective degrees by the office of the Dean Academics. These additional credits through MOOCs if to be considered for CGPA/Minor/Honors degree must be approved by Dean Academics prior to enrollment in the respective MOOCs.

Students acquiring additional credits for Honors/Minor degree must adhere to the rules governing the award of the respective degree, otherwise, a student applying for registering into additional credits through MOOCs must possess a minimum CGPA of 7.5 till that semester.

Semester Promotion policy

A student shall be eligible to carry forward all the courses of I and II semesters till the III semester examinations. However, he/she shall not be eligible to attend the courses of IV semester until all the courses of I, II and III semesters are successfully completed.

Counselling procedure

- KLEF is committed to fostering a supportive and nurturing environment for our students, addressing not only their academic needs but also their psychological well-being. To achieve this, KLEF is implementing a comprehensive Mentor- Mentee Scheme aimed at providing holistic support through academic, career, and psychological counselling. To achieve this, KLEF implement a comprehensive Mentor-Mentee Scheme and establish the Central Academic Counselling Board (CACB) in addressing academic, career and student-psychological issues. The Mentor-Mentee Scheme aims to provide personalized guidance and support to students throughout their academic journey. Each student shall be assigned a mentor from the faculty, who will act as a guide, counselor, and advocate for the student's academic and personal growth. The mentor-mentee relationship is intended to facilitate communication, goal- setting, and problem-solving. The primary objectives of the Mentor-Mentee Scheme are:
- To facilitate a strong and positive mentor-mentee relationship that supports students' academic growth, personal development, and psychological well-being.
- To offer career counselling, guiding mentees in exploring career options, developing professional skills, and making informed career-related decisions.
- To provide psychological counselling, offering a safe space for mentees to discuss psychological concerns and providing appropriate support or referrals when needed.
- To provide tailored academic counselling, helping mentees set academic goals, plan their course of study, and navigate academic challenges effectively.
- Academic Counselling: The mentors oversee the following academic counselling activities which are not limited to:

- Providing guidance during academic registration sessions
- Monitoring attendance and addressing attendance-related concerns
- Communicating attendance and marks information to parents/guardians
- Addressing concerns related to backlogs and providing advice
- Advising on domain specializations and academic flexibilities
- Assisting students in exploring study abroad opportunities
- Conducting student and parent meetings to address academic concerns
- Career Counselling: The mentors oversee the following career counselling activities which are not limited to:
- Recommending technical skilling courses and certificate programs
- Facilitating internship opportunities and competitive exam preparations
- Guiding students through term papers, projects, hackathons, and coding challenges
- Providing information on higher education options and entrance exams
- Encouraging entrepreneurship awareness and guiding start-ups initiatives
- Assisting students in preparing for placements and future career goals
- Conducting student and parent meetings to discuss career aspirations
- Psychological Counselling: The Mentors oversee the following psychological counselling activities which are not limited to:
- Providing guidance on time management and classroom activities
- Addressing anti-ragging issues and promoting a positive attitude
- Providing support for managing mental stress and promoting well-being
- Addressing hostel, room, home, and food-related concerns
- Conducting student and parent meetings to address personal well-being

Mentor-Mentee allocation

The Department Academic Counselling Board (DACB) is responsible for assigning approximately 20 students to each faculty member, who will act as their mentor. The mentors will guide and support their assigned students throughout their academic journey.

Counsellors/mentors will be appointed from the students' respective parent departments, and these faculty members will continue as mentors until the students complete their course.

The counselling program aims to help students develop their character, academic abilities, professional skills, and social responsibilities. Mentors play a vital role in this process by:

Maintaining detailed records of mentor-mentee interactions in the ERP system. Mentors are required to update the ERP with counselling remarks for both students and their parents every fortnight.

Providing regular updates to parents about students' academic progress, career developments, and physiological status through various communication channels, including phone calls, SMS, WhatsApp, and Telegram.

Ensuring that counselling remarks are accurately recorded in the ERP system, and reflecting these updates in DACB monthly reports and CACB semester reports.

Academic Counselling Board

Academic Counselling Board is constituted by the Dean Academics. This board shall comprise of the Chairman, Convener, Principal/Director, HOD and Professor/Associate Professor. A student will be put under Academic Counselling Board in the following circumstances:

Has CGPA of less than 6.00.

Has F grade or Detained in multiple courses.

The first level of Counselling such students will be done by the Mentor of the student and the HoD followed by the ACB and the list of students who have to undergo the ACB counselling be forwarded by the HoD to the Office of Dean Academics.

The students undergoing the Academic Counselling Board process may be allowed to register only for a few courses based on the recommendation of Academic Counselling Board.

Rustication policy

A student may be rusticated from the KLEF on disciplinary grounds, based on the recommendations of any empowered committee, by the Vice Chancellor.

Malpractice penalty policy

The following actions constitute malpractice during examinations and are subject to disciplinary actions as outlined below:

Clause 1: Possession of unauthorized material in the examination hall (e.g., paper, notebooks, programmable calculators, cell phones, or any material related to the exam subject). This includes any marks on the candidate's body that could be used as an aid. Penalty: Immediate expulsion from the examination hall, without cancelling the paper.

Clause 2: a) Providing or receiving assistance, or communicating with others via oral means, body language, or electronic devices (such as cell phones), either inside or outside the examination hall. b) Smuggling in or out answer sheets, additional sheets, or arranging to send out the question paper or answer sheets during or after the exam. c) Using objectionable or offensive language in the answer paper or in communication with examiners, or attempting to influence examiners to award passing marks. d) Exchanging answer scripts or additional sheets in the examination hall Penalty: Expulsion from the examination hall and cancellation of the comprehensive examination 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

Clause 3: Copying from any unauthorized material (e.g., paper, books, programmable calculators, palm computers) during the exam. Penalty: Expulsion from the examination hall, cancellation of the exam performance in that subject, and a fine of Rs. 1000.

Clause 4: a) Taking the answer script outside the exam hall, tearing the script or any part of it inside or outside the hall. b) Appearing for the exam in a drunken condition. Penalty: Expulsion from the examination hall and cancellation of comprehensive examination 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 comprehensive examinations of the subjects of that semester/year.

Clause 5: a) Disobeying examination authorities, creating disturbances, organizing or instigating a walk-out, threatening or assaulting officials, or damaging property inside or outside the exam hall. b) Possession of any lethal weapon or firearm in the examination hall. Penalty: Expulsion from the exam hall and cancellation of exam performance in all subjects. The student will be debarred from future exams and may forfeit their seat. Outsiders will be handed over to the police.

Clause 6: Impersonation during the examination.

Penalty: Both the impersonator and the original candidate will be expelled from the exam hall. The original candidate's performance will be cancelled in all subjects, including practical and project work, and they will be barred from exams for two consecutive semesters. Continuation in the course is subject to academic regulations. The impersonator (if an outsider) will be handed over to the police.

Clause 7: Repeated offenses.

Penalty: For a second offense, the candidate will face expulsion from the exam hall and cancellation of all exam performances for that term, with a fine of Rs. 1000. Repeated academic dishonesty may result in the issuance of a transfer certificate (TC).

Clause 8: Any other form of malpractice not specified.

Penalty: Punishment will be determined by the Examination Malpractice Committee and approved by the Vice-Chancellor.

Plagiarism Penalty Policy

Plagiarism is considered a serious breach of academic integrity, compromising both the ethical standards of the university and the intellectual development of students. The university enforces a strict zero-tolerance policy regarding plagiarism, and all students are expected to uphold the highest standards of academic honesty. Penalties for plagiarism will be applied as follows:

First Offense:

Minor Plagiarism (e.g., improper citation, small portions of copied work): The student will receive a warning and be required to resubmit the work with proper citations. Marks may be reduced up to 50%.

Major Plagiarism (e.g., copying significant portions, submitting another person's work): The assignment will receive a grade of zero. The student may be required to attend a mandatory workshop on academic integrity.

Second Offense:

Any second offense, regardless of severity, will result in a zero for the assignment and an official letter of reprimand placed in the student's record. The student will be placed on academic probation.

Third Offense:

The student will face suspension from the university for one academic term. A record of academic misconduct will be permanently placed in the student's academic file.

Repeated Violations:

Further violations after the third offense may lead to expulsion from the university.

In cases of group work, if plagiarism is identified, all group members will be held equally accountable unless it can be demonstrated that the act of plagiarism was isolated to specific individuals.

Course Syllabus

Course outcomes, Bloom's level and outcome mapping are as approved for the programme. The unit-wise syllabus for Professional Core courses is that prescribed by the Pharmacy Council of India.

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester I	PCC	4-0-0-0	4	4	M NARENDER - mnarender@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Investigation, Characterization and quantification of organic compounds using analytical instruments	2	PO1 (3), PO2 (2), PSO1 (2)
CO2	Investigate and determine the structure of typical organic chemical compounds using NMR spectroscopy	3	PO1 (3), PO2 (2), PSO1 (2)
CO3	Investigate and determine the structure of typical organic chemical compounds using MS spectrometry	3	PO1 (3), PO2 (2), PSO1 (2)
CO4	Understand the isolation, purification and quantification of typical organic chemical compounds using chromatography techniques	2	PO1 (3), PO2 (2), PSO1 (2)
CO5	Understand the concepts of electrophoresis and radio-immuno assays	2	PO1 (2), PO2 (2), PSO1 (2)
CO6	Investigate and determine the structure of typical chemical compounds using X-Ray Diffraction methods	3	PO1 (2), PO2 (2), PSO1 (2)

SCOPE

This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.

OBJECTIVES

After completion of course student is able to know,

- Chemicals and Excipients The analysis of various drugs in single and combination dosage forms
- Theoretical and practical skills of the instruments

SYLLABUS

Unit 1 11 Hrs

a. UV-Visible spectroscopy: Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV- Visible spectroscopy. b. IR spectroscopy: Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier - Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy c. Spectroflourimetry: Theory of Fluorescence, Factors affecting fluorescence, Quenchers, Instrumentation and Applications of fluorescence spectrophotometer. d. Flame emission spectroscopy and Atomic absorption spectroscopy: Principle, Instrumentation, Interferences and Applications.

Unit 2 11 Hrs

NMR spectroscopy: Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and 13C NMR. Applications of NMR spectroscopy.

Unit 3 11 Hrs

Mass Spectroscopy: Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Meta stable ions, Isotopic peaks and Applications of Mass spectroscopy

Unit 4 11 Hrs

Chromatography: Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution and applications of the following: a) Paper chromatography b) Thin Layer chromatography c) Ion exchange chromatography d)Column chromatography e) Gas chromatography f) High Performance Liquid chromatography

g) Affinity chromatography

Unit 5 11 Hrs

a. Electrophoresis: Principle, Instrumentation, Working conditions, factors affecting separation and applications of the following: a) Paper electrophoresis b) Gel electrophoresis c) Capillary electrophoresis d) Zone electrophoresis e) Moving boundary electrophoresis f) Iso electric focusing b. X ray Crystallography: Production of X rays, Different X ray diffraction methods, Bragg's law, Rotating crystal technique, X ray powder technique, Types of crystals and applications of X- ray diffraction.

Unit 6 5 Hrs

Immunological assays : RIA (Radio immuno assay), ELISA, Bioluminescence assays.

REFERENCE BOOKS

#	Reference
1	Principles of Instrumental Analysis, Doglas A Skoog, F. James Holler, Timothy A. Nieman, 5th edition (2019), Eastern press, Bangalore.
2	Quantitative Analysis of Drugs in Pharmaceutical formulation , P D Sethi , 3rd edition (2015), CBS Publishers, New Delhi.
3	Spectroscopy by Silverstein, John & Wiley & Sons. Inc.,, 6th edition (2021), Wiley publications.
4	Instrumental Analysis, Willard and Merritt, 7th edition (2004), EWP, East West Press Ltd., Delhi/Madras.
5	Organic spectroscopy., Y.R. Sharma , 5th edition (2013), Chand Publishers, Delhi .

26PY5102 · DDS

DRUG DELIVERY SYSTEMS

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester I	PCC	4-0-0-0	4	4	M KASI VISWANADH - mkasiviswanadh@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Understand the process of pilot plant and scale up of pharmaceutical dosage forms	2	PO1 (2), PO2 (2), PSO1 (2)
CO2	Understand about suitable drugs and polymers for specific controlled drug delivery systems and discuss modern strategies	2	PO1 (2), PO2 (2), PSO1 (2)
CO3	Understand various approaches for rate controlled and ocular drug delivery systems	2	PO1 (2), PO2 (2), PSO2 (2)
CO4	Understand the formulation concepts involved in development of GRDDS, buccal and transdermal DDS	2	PO1 (2), PO2 (2), PSO1 (2)
CO5	Apply the evaluation of buccal and transdermal DDs	3	PO1 (2), PO2 (3), PSO1 (3)
CO6	Apply novel strategies in delivery of biosimilars like proteins, peptides and vaccines	3	PO1 (2), PO2 (3), PSO1 (3)

SCOPE

This course is designed to impart knowledge on the area of advances in novel drug delivery systems.

OBJECTIVES

Upon completion of the course, student shall be able to understand

- The various approaches for development of novel drug delivery systems.
- The criteria for selection of drugs and polymers forthe development of delivering system The formulation and evaluation of Novel drug delivery systems..

SYLLABUS

Unit 1 10 Hrs

Sustained Release(SR) and Controlled Release (CR) formulations: Introduction & basic concepts, advantages/ disadvantages, factors influencing, Physicochemical & biological approaches for SR/CR formulation, Mechanism of Drug Delivery from SR/CR formulation. Polymers: introduction, definition, classification, properties and application Dosage Forms for Personalized Medicine: Introduction, Definition, Pharmacogenetics, Categories of Patients for Personalized Medicines: Customized drug delivery systems, Bioelectronic Medicines, 3D printing of pharmaceuticals, Telepharmacy.

Unit 2 10 Hrs

Rate Controlled Drug Delivery Systems: Principles & Fundamentals, Types, Activation; Modulated Drug Delivery Systems;Mechanically activated, pH activated, Enzyme activated, and Osmotic activated Drug Delivery Systems Feedback regulated Drug Delivery Systems; Principles & Fundamentals.

Unit 3 10 Hrs

Gastro-Retentive Drug Delivery Systems: Principle, concepts advantages and disadvantages, Modulation of GI transit time approaches to extend GI transit. Buccal Drug Delivery Systems: Principle of muco adhesion, advantages and disadvantages, Mechanism of drug permeation, Methods of formulation and its evaluations.

Unit 4 6 Hrs

Occular Drug Delivery Systems: Barriers of drug permeation, Methods to overcome barriers.

Unit 5 10 Hrs

Transdermal Drug Delivery Systems: Structure of skin and barriers, Penetration enhancers, Transdermal Drug Delivery Systems, Formulation and evaluation.

Unit 6 8 Hrs

Protein and Peptide Delivery: Barriers for protein delivery. Formulation and Evaluation of delivery systems of proteins and other macromolecules.

Unit 7 6 Hrs

Vaccine delivery systems: Vaccines, uptake of antigens, single shot vaccines, mucosal and transdermal delivery of vaccines.

REFERENCE BOOKS

#	Reference
1	Novel Drug Delivery Systems,, Y W. Chien, 1991, Marcel Dekker, Inc..
2	Encyclopedia of Controlled Delivery, Edith Mathiowitz,, 1999, Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim.
3	Controlled Drug Delivery -concepts and advances, S.P. Vyas and R.K. Khar, 2004, Vallabh Prakashan, New Delhi.
4	Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS) , Adeboye Adejare , 2020, Elsevier Academic Press .

26PY5103 · MP

MODERN PHARMACEUTICS

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester I	PCC	4-0-0-0	4	4	A ANKA RAO - ankarao@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	understand various preformulation concepts in dosage form Development	2	PO1 (2), PSO1 (3)
CO2	Understand new dosage forms by applying the principles of optimization.	2	PO2 (2), PSO1 (3)
CO3	understand validation protocol for solid and liquid dosage forms.	2	PO2 (2), PSO1 (3)
CO4	Apply the cGMP and Industrial management principles in dosage form development	3	PO2 (2), PSO1 (3)
CO5	Understand the process of compaction and compression in solid dosage form development	2	PO1 (2), PSO1 (3)
CO6	Understand the study of consildation parameter	2	PO1 (2), PSO1 (3)

SCOPE

Course designed to impart advanced knowledge andskills required to learn various aspects and concepts at pharmaceutical industries

OBJECTIVES

Upon completion of the course, student shall be able to understand

- The elements of preformulation studies.
- The Active Pharmaceutical Ingredients and Generic drug Product development
- Industrial Management and GMP Considerations.
- Optimization Techniques & Pilot Plant Scale Up Techniques
- Stability Testing, sterilization process & packaging of dosage forms.

SYLLABUS

Unit 1 10 Hrs

a. Preformation Concepts - Drug Excipient interactions - different methods, kinetics of stability, Stability testing. Theories of dispersion and pharmaceutical Dispersion (Emulsion and Suspension, SMEDDS) preparation and stability Large and small volume parental - physiological and formulation consideration, Manufacturing and evaluation. b. Optimization techniques in Pharmaceutical Formulation: Concept and parameters of optimization, Optimization techniques in pharmaceutical formulation and processing. Statistical design, Response surface method, Contour designs, Factorial designs and application in formulation

Unit 2 10 Hrs

Validation : Introduction to Pharmaceutical Validation, Scope & merits of Validation, Validation and calibration of Master plan, ICH & WHO guidelines for calibration and validation of equipments, Validation of specific dosage form, Types of validation. Government regulation, Manufacturing Process Model, URS, DQ, IQ, OQ & P.Q. of facilities.

Unit 3 10 Hrs

cGMP & Industrial Management: Objectives and policies of current good manufacturing practices, layout of buildings, services, equipments and their maintenance Production management: Production organization, , materials management, handling and transportation, inventory management and control, production and planning control, Sales forecasting, budget and cost control, industrial and personal relationship. Concept of Total Quality Management.

Unit 4 10 Hrs

Compression and compaction: Physics of tablet compression, compression, consolidation, effect of friction, distribution of forces, compaction profiles. Solubility.

Unit 5 10 Hrs

Study of consolidation parameters; Diffusion parameters, Dissolution parameters and Pharmacokinetic parameters, Heckel plots, Similarity factors - f2 and f1, Higuchi and Peppas plot, Linearity Concept of significance, Standard deviation , Chi square test, students T-test , ANOVA test.

REFERENCE BOOKS

#	Reference
1	Modern Pharmaceutics, Gillbert , 2, mercel.
2	Modern Pharmaceutics, Gilbert S. Banker, Christopher T. Rhodes, 3, CRC Press.
3	Remington: The Science and Practice of Pharmacy, Loyd V. Allen Jr., 3, Pharmaceutical Press.
4	Aulton's Pharmaceutics: The Design and Manufacture of Medicines, Michael E. Aulton, Kevin M.G. Taylor, 3, Elsevier.

26PY5104 · RA

REGULATORY AFFAIR

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester I	PCC	4-0-0-0	4	4	SIVADASU PRAVEEN - praveen.sivadasu@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Understand the concepts of innovator and generic drugs in drug development process	2	PO1 (2), PO3 (2), PSO1 (2)
CO2	Understand Regulatory requirements for new drug application approval in pharmaceuticals	2	PO1 (2), PO3 (2), PSO1 (2)
CO3	Understand ICH guidelines for filing and approval process of drug products in different countries	2	PO1 (2), PO3 (2), PSO1 (2)
CO4	Illustrate the post approval regulatory requirements for products and submission of global documents in Common Technical Document/ eCTD formats	3	PO1 (3), PO3 (3), PSO1 (3)
CO5	Illustrate the regulatory procedures involved in non-clinical and clinical drug development	3	PO1 (3), PO3 (3), PSO1 (3)
CO6	Apply the principles of regulatory affairs in drug development process, filing and approval, non-clinical and clinical drug development in global scenario	3	PO1 (3), PO3 (3), PSO1 (3)

SCOPE

Course designed to impart advanced knowledge and skills required to learn the concept of generic drug and their development, various regulatory filings in different countries, different phases of clinical trials and submitting regulatory documents : filing process of IND, NDA and ANDA To know the approval process of To know the chemistry, manufacturing controls and their regulatory importance To learn the documentation requirements for To learn the importance and

OBJECTIVES

- Upon completion of the course, it is expected that the students will be able to understand The Concepts of innovator and generic drugs, drug development process The Regulatory guidance's and guidelines for filing and approval process Preparation of Dossiers and their submission to regulatory agencies in different countries Post approval regulatory requirements for actives and drug products Submission of global documents in CTD/ eCTD formats Clinical trials requirements for approvals forconducting clinical trials Pharmacovigilence and process of monitoring in clinical trials.

SYLLABUS

Unit 1 12 Hrs

a. Documentation in Pharmaceutical industry: Master formula record, DMF (Drug Master File), distribution records. Generic drugs product development Introduction , Hatch- Waxman act and amendments, CFR (CODE OF FEDERAL REGULATION) ,drug product performance, in-vitro, ANDA regulatory approval process, NDA approval process, BE and drug product assessment, in -vivo, scale up process approval changes, post marketing surveillance, outsourcing BA and BE to CRO. b. Regulatory requirement for product approval: API, biologics, novel, therapies obtaining NDA, ANDA for generic drugs ways and means of US registration for foreign drugs

Unit 2 12 Hrs

CMC, post approval regulatory affairs. Regulation for combination products and medical devices.CTD and ECTD format, industry and FDA liaison. ICH - Guidelines of ICH-Q, S E, M. Regulatory requirements of EU, MHRA, TGA and ROW countries.

Unit 3 12 Hrs

Non clinical drug development: Global submission of IND, NDA, ANDA. Investigation of medicinal products dossier, dossier (IMPD) and investigator brochure (IB).

Unit 4 12 Hrs

Clinical trials: Developing clinical trial protocols. Institutional review board/ independent ethics committee Formulation and working procedures informed Consent process and procedures. HIPAA- new, requirement to clinical study process, pharmacovigilance safety monitoring in clinical trials.

REFERENCE BOOKS

#	Reference
1	Generic Drug Product Development, Solid Oral Dosage forms, Leon Shargel and IsaderKaufer, 2 (2013), CRC Press.
2	The Pharmaceutical Regulatory Process, Ira R. Berry and Robert P. Martin, 2 (2019), CRC Press.
3	FDA Regulatory Affairs- A Guide for Prescription Drugs, Medical Devices, and Biologics, Douglas J. Pisano, 2 (2008), CRC Press.
4	New Drug Approval Process: Accelerating Global Registrations, Richard A Guarino, 4 (2004), CRC Press.

26PY5105 · PP-I

PHARMACEUTICS PRACTICAL I

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester I	PCC	0-0-12-0	6	12	M KASI VISWANADH - mkasiviswanadh@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Analyse the Pharmacopoeial compounds and their formulations by various analytical techniques	4	PO1 (3), PO4 (3), PSO2 (3)
CO2	Preparation and evaluation of the different oral drug delivery systems	3	PO1 (3), PO4 (3), PSO2 (3)

EXPERIMENTS

#	Experiment
1	Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
2	Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3	Experiments based on HPLC
4	Experiments based on Gas Chromatography
5	Estimation of riboflavin/quinine sulphate by fluorimetry
6	Estimation of sodium/potassium by flame photometry
7	To perform In-vitro dissolution profile of CR/ SR marketed formulation
8	Formulation and evaluation of sustained release matrix tablets
9	Formulation and evaluation osmotically controlled DDS
10	Preparation and evaluation of Floating DDS- hydro dynamically balanced DDS
11	Formulation and evaluation of Muco adhesive tablets.
12	Formulation and evaluation of trans dermal patches.
13	To carry out preformulation studies of tablets.
14	To study the effect of compressional force on tablets disintegration time.
15	To study Micromeritic properties of powders and granulation.
16	To study the effect of particle size on dissolution of a tablet.
17	To study the effect of binders on dissolution of a tablet.
18	To plot Heckal plot, Higuchi and peppas plot and determine similarity factors. MOLECULAR PHARMACEUTICS (NANO TECHNOLOGY & TARGETED DDS) (NTDS)

REFERENCE BOOKS

#	Reference
1	Modern Pharmaceutics, Gillbert and S. Banker., 2013, CRC Press Inc..
2	Advances in Pharmaceutical Sciences Vol. 2-5, H.S. Bean & A.H. Beckett., 2012, Acdemic Press Inc..
3	Pharmaceutical dosage forms - Tablets, volume 1 -3 , Larry L Augsburger, Stephen W Hoag , 2006, Informa Healthcare .
4	Pharmaceutical dosage forms - Parenterals volume1-2 , Liberman & Lachman, Kenneth E. Avis , 2003, Informa Healthcare .

26PY5106 · S/A-I

SEMINAR/ASSIGNMENT

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester I	SDC	0-0-8-0	4	8	A V SURENDRA - avsurendra@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Select topic from the course content for deep learning towards seminar presentation	2	PO4, PSO1
CO2	Develop advanced content and present it as seminar	2	PO4, PSO1
CO3	Select topic from the course content for deep learning towards assignment preparation	2	PO4, PSO1
CO4	Develop advanced content and present it as assignment	2	PO4, PSO1

SYLLABUS

Select topic from the course content for deep learning towards seminar presentation

Develop advanced content and present it as seminar

REFERENCE BOOKS

#	Reference
1	"Pharmaceutical Sciences", Remington et al., 2020, Pharmaceutical Press.
2	"Medical Writing: A Prescription for Clarity", Neville W. Goodman and Martin B. Edwards, 2017, Cambridge University Press.
3	"Pharmaceutical Medicine and Translational Clinical Research", Divya Vohora and Gursharan Singh, 2017, 3 Springer.
4	Surfactants in Personal Care Products and Decorative Cosmetics, Linda D. Rhein, Mitchell Schlossman, Anthony O'Lenick, 2006, CRC Press.

26PY5107 · MP

MOLECULAR PHARMACEUTICS

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester II	PCC	4-0-0-0	4	4	U CHANDRA TEJA - uchandrateja@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Understand the concepts involved in Drug targeting systems	2	PO2 (2), PSO2 (2)
CO2	Understand the preparation and evaluation of targeting methods	2	PO2 (2), PSO2 (2)
CO3	Design and develop various delivery systems for a specific drug target	3	PO2 (2), PSO2 (2)
CO4	Understand the preparation and evaluation of Intra nasal formulations	2	PO2 (3), PSO2 (2)
CO5	Understand the nucleic acid- based therapeutic drug delivery system	2	PO2 (3), PSO2 (2)
CO6	Applications of the potential target diseases for gene therapy	3	PO2 (3), PSO2 (2)

SCOPE

This course is designed to impart knowledge on the area of advances in novel drug delivery systems.

OBJECTIVES

Upon completion of the course student shall be able to understand

- The various approaches for development of novel drug delivery systems.
- The criteria for selection of drugs and polymers forthe development of
- NTDS The formulation and evaluation of novel drug delivery systems.

SYLLABUS

Unit 1 12 Hrs

Targeted Drug Delivery Systems: Concepts, Events and biological process involved in drug targeting. Tumor targeting and Brain specific delivery.

Unit 2 12 Hrs

Targeting Methods: introduction preparation and evaluation. Nano Particles & Liposomes: Types, preparation and evaluation.

Unit 3 12 Hrs

Micro Capsules / Micro Spheres: Types, preparation and evaluation , Monoclonal Antibodies ; preparation and application, preparation and application of Niosomes, Aquasomes, Phytosomes, Electrosomes.

Unit 4 12 Hrs

Pulmonary Drug Delivery Systems : Aerosols, propellents, ContainersTypes, preparation and evaluation, Intra Nasal Route Delivery systems; Types, preparation and evaluation.

Unit 5 12 Hrs

Nucleic acid based therapeutic delivery system : Gene therapy, introduction (ex-vivo & in-vivo gene therapy). Potential target diseases for gene therapy (inherited disorder and cancer). Gene expression systems (viral and nonviral gene transfer). Liposomal gene delivery systems. Biodistribution and Pharmacokinetics. knowledge of therapeutic antisense molecules and aptamers as drugs of future.

REFERENCE BOOKS

#	Reference
1	Novel Drug Delivery Systems, Y W. Chien, 2, 1992, Marcel Dekker, Inc..
2	Encyclopedia of Controlled Delivery, Edith Mathiowitz, 1, 2009, John Wiley and Sons.
3	Targeted and COntrolled Drug delivery, Vyas and Khar, 1, 2019, Vallabh Prakashan, New Delhi.
4	Controlled and Novel Drug Delivery, N.K. Jain, 1, 2019, CBS Publishers.

#	Reference
5	Controlled Drug Delivery Systems, Robinson, J. R., Lee V. H. L, 2, 1987, Marcel Dekker, Inc..

ADVANCED BIOPHARMACEUTICS AND PHARMACOKINETICS

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester II	PCC	4-0-0-0	4	4	A ANKA RAO - ankarao@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Understand the mechanisms and factors affecting ADME processes through GIT	2	PO1 (2), PSO1 (2)
CO2	Discuss several biopharmaceutic considerations, BCS, IVIVC and permeability in drug product design and in vitro drug product performance	2	PO1 (2), PSO1 (2)
CO3	Understand the impact of drug interactions on drug action	2	PO1 (2), PSO1 (2)
CO4	Explain the protocol for bioavailability/bioequivalence studies and their role in generic product development	2	PO1 (2), PSO1 (2)
CO5	Illustrate the assessment of pharmacokinetic parameters assuming different models	3	PO1 (2), PSO1 (2)
CO6	Illustrate the application of pharmacokinetic principles in development of drug products and biosimilars	3	PO1 (2), PSO1 (2)

SCOPE

This course is designed to impart knowledge and skills necessary for dose calculations, dose adjustments and to apply biopharmaceutics theories in practical problem solving. Basic theoretical discussions of the principles of biopharmaceutics and pharmacokinetics are provided to help the students' to clarify the concepts.

OBJECTIVES

- Upon completion of this course it is expected that students will be able understand, The basic concepts in biopharmaceutics and pharmacokinetics. The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination. The critical evaluation of biopharmaceutic studies involving drug product equivalency. The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters. The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic

SYLLABUS

Unit 1 12 Hrs

Drug Absorption from the Gastrointestinal Tract: Gastrointestinal tract, Mechanism of drug absorption, Factors affecting drug absorption, pH-partition theory of drug absorption. Formuulation and physicochemical factors: Dissolution rate, Dissolution process, Noyes-Whitney equation and drug dissolution, Factors affecting the dissolution rate. Gastrointestinal absorption: role of the dosage form: Solution (elixir, syrup and solution) as a dosage form ,Suspension as a dosage form, Capsule as a dosage form, Tablet as a dosage form ,Dissolution methods ,Formulation and processing factors, Correlation of in vivo data with in vitro dissolution data.Transport model: Permeability-Solubility-Charge State and the pH Partition Hypothesis, Properties of the Gastrointestinal Tract (GIT), pH Microclimate Intracellular pH Environment, Tight-Junction Complex.

Unit 2 12 Hrs

Biopharmaceutic considerations in drug product design and In Vitro Drug Product Performance: Introduction, biopharmaceutic factors affecting drug bioavailability, rate-limiting steps in drug absorption, physicochemical nature of the drug formulation factors affecting drug product performance, in vitro: dissolution and drug release testing, compendial methods of dissolution, alternative methods of dissolution testing,meeting dissolution requirements,problems of variable control in dissolution testingperformance of drug products. In vitro-in vivo correlation, dissolution profile comparisons, drug product stability,considerations in the design of a drug product.

Unit 3 12 Hrs

Pharmacokinetics: Basic considerations, pharmacokinetic models, compartment modeling: one compartment model- IV bolus, IV infusion, extra-vascular. Multi compartment model:two compartment - model in brief, non-linear pharmacokinetics: cause of non-linearity, Michaelis - Menten equation, estimation of kmax and vmax.

Drug interactions: introduction, the effect of protein- binding interactions,the effect of tissue-binding interactions,cytochrome p450-based drug interactions,drug interactions linked to transporters.

Unit 4 12 Hrs

Drug Product Performance, In Vivo: Bioavailability and Bioequivalence: drug product performance, purpose of bioavailability studies, relative and absolute availability. methods for assessing bioavailability, bioequivalence studies, design and evaluation of bioequivalence studies, study designs, crossover study designs, evaluation of the data, bioequivalence example, study submission and drug review process. biopharmaceutics classification system, methods. Permeability: In-vitro, in-situ and In-vivo methods.generic biologics (biosimilar drug products),clinical significance of bioequivalence studies, special concerns in bioavailability and bioequivalence studies, generic substitution.

Unit 5 12 Hrs

Application of Pharmacokinetics: Modified-Release Drug Products, Targeted Drug Delivery Systems and Biotechnological Products. Introduction to Pharmacokinetics and pharmacodynamic, drug interactions. Pharmacokinetics and pharmacodynamics of biotechnology drugs. Introduction, Proteins and peptides, Monoclonal antibodies, Oligonucleotides, Vaccines (immunotherapy), Gene therapies.

REFERENCE BOOKS

#	Reference
1	1. Biopharmaceutics and Clinical Pharmacokinetics , Milo Gibaldi, 1990, , Lea and Febiger.
2	Applied Biopharmaceutics & Pharmacokinetics, Leon Shargel, Andrew B.C. Yu, and Susanna Wu-Pong, 1980, Shargel publisher.
3	Biopharmaceutics and Clinical Pharmacokinetics, Milo Gibaldi and Donald Perrier, 1995, CRS publisher.
4	Pharmacokinetics: Principles and Applications, David D'Argenio and Anil S. J. Menon, 1992, Shargel publisher.

COMPUTER AIDED DRUG DELIVERY SYSTEM

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester II	PCC	4-0-0-0	4	4	M KASI VISWANADH - mkasiviswanadh@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Understand the history of computers in pharmaceutical research and development	2	PO1 (3), PO4 (3)
CO2	Understand computational modeling of drug disposition	2	PO1 (3), PO4 (3)
CO3	Apply the approaches of optimization techniques in pharmaceutical formulation	3	PO1 (3), PO4 (3)
CO4	Understand the importance of computers in biopharmaceutical characterization	2	PO1 (3), PO4 (3)
CO5	Understand the role of computer simulations in PK-PD and clinical data management	2	PO1 (3), PO4 (3)
CO6	Illustrate the application of AI, robotics and CFD in pharmacy field	3	PO1 (3), PO4 (3)

SCOPE

This course is designed to impart knowledge and skills necessary for computer Applications in pharmaceutical research and development who want to understand the application of computers across the entire drug research and development process. Basic theoretical discussions of the principles of more integrated and coherent use of computerized information (informatics) in the drug development process are provided to help the students to clarify the concepts.

OBJECTIVES

- Upon completion of this course it is expected that students will be able to understand, History of Computers in Pharmaceutical Research and Development Computational Modeling of Drug Disposition Computers in Preclinical Development Optimization Techniques in Pharmaceutical Formulation Computers in Market Analysis Computers in Clinical Development Artificial Intelligence (AI) and Robotics Computational fluid dynamics(CFD)

SYLLABUS

Unit 1 12 Hrs

a. Computers in Pharmaceutical Research and Development: A General Overview: History of Computers in Pharmaceutical Research and Development. Statistical modeling in Pharmaceutical research and development: Descriptive versus Mechanistic Modeling, Statistical Parameters, Estimation, Confidence Regions, Nonlinearity at the Optimum, Sensitivity Analysis, Optimal Design, Population Modeling b. Quality-by-Design In Pharmaceutical Development: Introduction, ICH Q8 guideline, Regulatory and industry views on QbD, Scientifically based QbD - examples of application.

Unit 2 12 Hrs

Computational Modeling Of Drug Disposition: Introduction ,Modeling Techniques: Drug Absorption, Solubility, Intestinal Permeation, Drug Distribution ,Drug Excretion, Active Transport; P-gp, BCRP, Nucleoside Transporters, hPEPT1, ASBT, OCT, OATP, BBB-Choline Transporter.

Unit 3 12 Hrs

Computer-aided formulation development:: Concept of optimization, Optimization parameters, Factorial design, Optimization technology & Screening design. Computers in Pharmaceutical Formulation: Development of pharmaceutical emulsions, microemulsion drug carriers Legal Protection of Innovative Uses of Computers in R&D, The Ethics of Computing in Pharmaceutical Research, Computers in Market analysis

Unit 4 12 Hrs

a. Computer-aided biopharmaceutical characterization: Gastrointestinal absorption simulation. Introduction, Theoretical background, Model construction, Parameter sensitivity analysis, Virtual trial, Fed vs. fasted state, In vitro dissolution and in vitro- in vivo correlation, Biowaiver considerations b. Computer Simulations in Pharmacokinetics and Pharmacodynamics: Introduction, Computer Simulation: Whole Organism, Isolated Tissues, Organs, Cell, Proteins and Genes. c. Computers in Clinical Development: Clinical Data Collection and

Management, Regulation of Computer Systems

Unit 5 12 Hrs

Artificial Intelligence (AI), Robotics and Computational fluid dynamics: General overview, Pharmaceutical Automation, Pharmaceutical applications, Advantages and Disadvantages. Current Challenges and Future Directions.

REFERENCE BOOKS

#	Reference
1	Encyclopedia of Pharmaceutical Technology, Vol 13, , James Swarbrick, James. G.Boylan,, 13, Marcel Dekker Inc, New York, 1996. .
2	Computer Applications in Pharmaceutical Research and Development, 2006, , Sean Ekins, , 4, John Wiley & Sons..
3	Computer-Aided Applications in Pharmaceutical Technology, Jelena Djuris,, 1st Edition, Woodhead Publishing..
4	Biopharmaceutics and Clinical Pharmacokinetics, An Introduction, Robert. E. Notari, 4, Marcel Dekker Inc, NewYork and Basel,.

26PY5110 · CC

COSMETIC AND COSMECEUTICALS

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester II	PCC	4-0-0-0	4	4	SIVADASU PRAVEEN - praveen.sivadasu@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Understand the Regulatory provisions related to the import, manufacture and sale of cosmetics.	2	PO2 (2), PSO1 (1)
CO2	Understand the diverse skin problems and how to overcome through skin preparations	2	PO2 (2), PSO1 (1)
CO3	Understand the Formulation and evaluation of a variety of cosmetic products.	2	PO2 (2), PSO1 (1)
CO4	Understanding the key ingredients and basic science to develop cosmetics and Cosmeceuticals.	2	PO2 (2), PSO1 (1)
CO5	Understand the knowledge of the various technologies involved in cosmetics manufacture.	2	PO2 (2), PSO1 (1)
CO6	Understand the Design of cosmeceuticals and herbal formulations .	2	PO2 (2), PSO1 (1)

SCOPE

This course is designed to impart knowledge and skills necessary forthefundamental need for cosmetic and cosmeceutical products.

OBJECTIVES

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

- Key ingredients used in cosmetics and cosmeceuticals.
- Key building blocks for various formulations.
- Current technologies in the market Various keyingredients and basic science to develop cosmetics and cosmeceuticals Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.

SYLLABUS

Unit 1 12 Hrs

Cosmetics - Regulatory : Definition of cosmetic products as per Indian regulation. Indian regulatory requirements for labeling of cosmetics Regulatory provisions relating to import of cosmetics., Misbranded and spurious cosmetics. Regulatory provisions relating to manufacture of cosmetics - Conditions for obtaining license, prohibition of manufacture and sale of certain cosmetics, loan license, offences and penalties.

Unit 2 12 Hrs

Cosmetics - Biological aspects : Structure of skin relating to problems like dry skin, acne, pigmentation, prickly heat, wrinkles andbody odor. Structure of hair andhair growth cycle. Common problems associated with oral cavity. Cleansing andcare needs for face, eye lids, lips, hands, feet, nail, scalp, neck, body and under-arm.

Unit 3 12 Hrs

Formulation Building blocks: Building blocks for different product formulations of cosmetics/cosmeceuticals. Surfactants - Classification and application. Emollients, rheological additives: classification and application. Antimicrobial used as preservatives, their merits and demerits. Factors affecting microbial preservative efficacy. Building blocks for formulation of a moisturizing cream, vanishing cream, cold cream, shampoo and toothpaste. Soaps and syndetbars. Perfumes; Classification of perfumes. Perfume ingredients listed as allergens in EU regulation. Controversial ingredients: Parabens, formaldehyde liberators, dioxane.

Unit 4 12 Hrs

Design of cosmeceutical products: Sun protection, sunscreens classification and regulatory aspects. Addressing dry skin, acne, sun-protection, pigmentation, prickly heat, wrinkles, body odor., dandruff, dental cavities, bleeding gums, mouth odor and sensitive teeth through cosmeceutical formulations.

Unit 5 12 Hrs

Herbal Cosmetics : Herbal ingredients used in Hair care, skin care and oral care. Review of guidelines for herbal cosmetics by private bodies like cosmos with respect to preservatives, emollients, foaming agents, emulsifiers and rheology modifiers. Challenges in formulating herbal cosmetics.

REFERENCE BOOKS

#	Reference
1	Handbook of cosmetic science and Technology, A.O.Barel, M.Paye and H.I. Maibach, 3 (2009), CRC Press.
2	Cosmetics Formulation, Manufacturing and Quality control, P.P. Sharma, 5 (2008), Vandana Publishers.
3	The Complete Technology Book on Herbal Perfumes and Cosmetics, H Panda, 2 (2012), NIR Project and Consultancy services.
4	Cosmetic Technology, Sanju Nanda, Arun Nanda, Roop K.Khar , 1 (2022), Birla Publication.

26PY5111 · PP-II

PHARMACEUTICS PRACTICAL II

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester II	PCC	0-0-12-0	6	12	M KASI VISWANADH - mkasiviswanadh@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Development and evaluation of different novel drug delivery systems by applying various computational tools	4	PO2 (3), PO4 (3), PSO1 (2)
CO2	Apply PK-PD simulation models in drug design and development, cosmeceuticals preparation	3	PO2 (3), PO4 (3), PSO1 (2)

EXPERIMENTS

#	Experiment
1	To study the effect of temperature change , non solvent addition, incompatible polymer addition in microcapsules preparation
2	Preparation and evaluation of Alginate beads
3	Formulation and evaluation of gelatin /albumin microspheres
4	Formulation and evaluation of liposomes/niosomes
5	Formulation and evaluation of spherules
6	Improvement ofdissolution characteristics ofslightly soluble drug bySolid dispersion technique.
7	Comparison of dissolution of two different marketed products /brands
8	Protein binding studies of a highly protein bound drug & poorly protein bound drug
9	Bioavailability studies of Paracetamol in animals.
10	Pharmacokinetic and IVIVC data analysis by WinnolineR software
11	In vitro cell studies for permeability and metabolism
12	DoE Using Design Expert® Software ®
13	Formulation data analysis Using Design Expert Software
14	Quality-by-Design in Pharmaceutical Development
15	Computer Simulations in Pharmacokinetics and Pharmacodynamics
16	Computational Modeling Of Drug Disposition
17	To develop Clinical Data Collection manual
18	To carry out Sensitivity Analysis, and Population Modeling.
19	Development and evaluation of Creams
20	Development and evaluation of Shampoo and Toothpaste base
21	To incorporate herbal and chemical actives to develop products
22	To address Dry skin, acne, blemish, Wrinkles, bleeding gums and dandruff INDUSTRIALPHARMACY(MIP) MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

REFERENCE BOOKS

#	Reference
1	Drug formulation manual, D.P.S. Kohli and D.H.Shah. , 2011, Eastern publishers, New Delhi..
2	Pharmaceutical Process Validation; , Fra. R. Berry and Robert A. Nash., 2003, CRC Press Inc..

#	Reference
3	Pharmaceutical Preformulations, J.J. Wells., 1988, CRC Press Inc..
4	Biopharmaceutics and Clinical Pharmacokinetics, An Introduction, Robert. E. Notari, 2013, Marcel Dekker Inc, NewYork and Basel.

26PY5112 · S/A-II

SEMINAR/ASSIGNMENT

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester II	SDC	0-0-8-0	4	8	A V SURENDRA - avsurendra@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Select topic from the course content for deep learning towards seminar presentation	2	PO4, PSO1
CO2	Develop advanced content and present it as seminar	2	PO4, PSO1
CO3	Select topic from the course content for deep learning towards assignment preparation	2	PO4, PSO1
CO4	Develop advanced content and present it as assignment	2	PO4, PSO1

SYLLABUS

To Select topic from the course content for deep learning towards seminar presentation

To Develop advanced content and present it as seminar

To Select topic from the course content for deep learning towards assignment preparation

To Develop advanced content and present it as assignment

REFERENCE BOOKS

#	Reference
1	"Pharmaceutical Medicine and Translational Clinical Research", Divya Vohora and Gursharan Singh, 2020, Springer.
2	"Pharmaceutical Sciences", Remington et al., 2017, Pharmaceutical Press.
3	"Medical Writing: A Prescription for Clarity", Neville W. Goodman and Martin B. Edwards, 2017, Cambridge University Press.
4	Surfactants in Personal Care Products and Decorative Cosmetics, Linda D. Rhein, Mitchell Schlossman, Anthony O'Lenick, 2006, CRC Press.

26PY5113 · RMB

RESEARCH METHODOLOGY AND BIOSTATISTICS

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester III	PCC	4-0-0-0	4	4	G CHARAN - charankumarganteda@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Understand the basic principles of research methodology and its role in pharmaceutical aspect	2	PO2 (3), PSO1 (2)
CO2	Understand the basic concepts of biostatistics	2	PO2 (3), PSO1 (2)
CO3	Illustrate the importance of biostatistics in research	3	PO2 (3), PSO1 (2)
CO4	Develop research proposal following the principles of medical research	3	PO2 (3), PSO1 (2)
CO5	Apply the guidelines of CPCSEA in preclinical experimentation	3	PO2 (3), PSO1 (2)
CO6	Understand the principles of Declaration of Helsinki	2	PO2 (3), PSO1 (2)

SYLLABUS

Unit 1

General Research Methodology: Research, objective, requirements, practical difficulties, review of literature, study design, types of studies, strategies to eliminate errors/bias, controls, randomization, crossover design, placebo, blinding techniques.

Unit 2

Biostatistics: Definition, application, sample size, importance of sample size, factors influencing sample size, dropouts, statistical tests of significance, type of significance tests, parametric tests(students "t" test, ANOVA, Correlation coefficient, regression), non-parametric tests (wilcoxan rank tests, analysis of variance, correlation, chi square test), null hypothesis, P values, degree of freedom, interpretation of P values.

Unit 3

Medical Research: History, values in medical ethics, autonomy, beneficence, non- maleficence, double effect, conflicts between autonomy and beneficence/non- maleficence, euthanasia, informed consent, confidentiality, criticisms of orthodox medical ethics, importance of communication, control resolution, guidelines, ethics committees, cultural concerns, truth telling, online business practices, conflicts of interest, referral, vendor relationships, treatment of family members, sexual relationships, fatality.

Unit 4

CPCSEA guidelines for laboratory animal facility: Goals, veterinary care, quarantine, surveillance, diagnosis, treatment and control of disease, personal hygiene, location of animal facilities to laboratories, anesthesia, euthanasia, physical facilities, environment, animal husbandry, record keeping, SOPs, personnel and training, transport of lab animals.

Unit 5

Declaration of Helsinki: History, introduction, basic principles for all medical research, and additional principles for medical research combined with medical care.

REFERENCE BOOKS

#	Reference
1	Research Methodology , RK Khanna bis and Suvasis Saha, 2003, orien.
2	Biostatistics and Research methodology, N. K. Nag,, 3rd Edition, 2004, Kalyani.
3	Fundamental of Statistics, S.C.Guptha , 2013, Himalaya Publishing House.
4	Design and Analysis of Experiments, Pannerselvam, 2022, PHILearning Private Limited,R..

26PY5114 · JC-I

JOURNAL CLUB

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester III	SDC	0-0-2-0	1	2	A V SURENDRA - avsurendra@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Select a research paper published in reputed journal by using search engines and databases	2	PO2, PSO1
CO2	Critically appraise the published research work	2	PO2, PSO1
CO3	Develop a report	2	PO2, PSO1
CO4	Present the critical observations and discuss	2	PO2, PSO1

SYLLABUS

To Select a research paper published in reputed journal by using search engines and databases

Critically appraise the published research work

REFERENCE BOOKS

#	Reference
1	"Medical Writing: A Prescription for Clarity", Neville W. Goodman and Martin B. Edwards, 2020, Cambridge University Press.
2	"Pharmaceutical Sciences", Remington et al., 2017, Pharmaceutical Press.
3	"Pharmaceutical Medicine and Translational Clinical Research", Divya Vohora and Gursharan Singh, 2017, Springer.
4	Surfactants in Personal Care Products and Decorative Cosmetics, Linda D. Rhein, Mitchell Schlossman, Anthony O'Lenick, 2006, CRC Press.

26PY5115 · D/P-I

DISCUSSION / PRESENTATION (PROPOSAL PRESENTATION)

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester III	SDC	0-0-4-0	2	4	SIVADASU PRAVEEN - praveen.sivadasu@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Identify the research problem	2	PO2, PSO2
CO2	Discuss research problem with team, peers and guide for solution	2	PO2, PSO2
CO3	Develop a protocol report on the critically appraised research problem with aim and objectives	3	PO2, PSO2
CO4	Analyse and present the critically appraised research problem in appropriate form and discuss the plan of work	4	PO2, PSO2

SYLLABUS

Research problem identification by refering various journals

Finding the solution for research problem with the team and research guides

Framing of aim, objectives and protocol for the identified research problem

Prepare a presentation about the identified research problem and discuss the plan of research work

REFERENCE BOOKS

#	Reference
1	Journal of Drug Delivery Science and Technology, Florence Siepmann, 97 (2024), Elsevier.
2	Drug delivery , Moein Moghimi , 31 (2024), Taylor and Francis .
3	Current drug delivery , Ricardo J. Dinis-Oliveira, 21 (2024), Bentham Science.
4	AAPS Pharma Sci tech, Robert O Williams III, 25 (2024), Springer Nature .

26PY5116 · RW

RESERCH WORK

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester III	PRI	0-0-28-0	14	28	A ANKA RAO - ankarao@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Review the latest literature in selected area of work	2	PO2 (2), PO4 (2), PSO2 (2)
CO2	Conduct research experiments to meet the aim and objectives of proposed research work	4	PO2 (2), PO4 (2), PSO2 (3)
CO3	Evaluate the findings and plan alterations or new methodologies or procedures for further improvement	5	PO2 (2), PO4 (2), PSO2 (3)
CO4	Document the findings of conducted experiments	2	PO2 (2), PO4 (2), PSO2 (3)
CO5	Interpret the results obtained and summarize the work with a conclusion	4	PO2 (2), PO4 (2), PSO2 (2)
CO6	I Interpret the results obtained and summarize the work with a conclusion	2	PO2 (2), PO4 (2), PSO2 (2)

SYLLABUS

Understanding Review the latest literature in selected area of work

Analyze the Conduct research experiments to meet the aim and objectives of proposed research work

Evaluate the findings and plan alterations or new methodologies or procedures for further improvement

Understanding the Document the findings of conducted experiments

Analyze the interpret the results obtained and summarize the work with a conclusion

Creating the interpret the results obtained and summarize the work with a conclusion

REFERENCE BOOKS

#	Reference
1	Journal of controlled release Journal of drug delivery science and technology DDIP IJP, y w chein, 2, elsevier.
2	Journal of advanced drug delivery system, robinson, 2, elseevier.
3	Journal of drug delivery technology, Prof. Dr. Florence Siepman, 2, sciiencedirect.
4	Advanced drug delivery system, Y W CHEIN, 2, elsevier.
5	journal of controlled drug delivery sytem, Robinson, 2, sciiencedirect.

26PY5117 · JC-II

JOURNAL CLUB

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester IV	SDC	0-0-2-0	1	2	A V SURENDRA - avsurendra@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Select a research paper published in reputed journal by using search engines and databases	2	PO2, PO4, PSO1
CO2	Critically appraise the published research work	2	PO2, PO4, PSO1
CO3	Develop a report	2	PO2, PO4, PSO1
CO4	Present the critical observations and discuss	2	PO2, PO4, PSO1

SYLLABUS

Identify the research problem

Discuss research problem with team, peers and guide for solution

REFERENCE BOOKS

#	Reference
1	Surfactants in Personal Care Products and Decorative Cosmetics, Linda D. Rhein, Mitchell Schlossman, Anthony O'Lenick, 2017, CRC Press.
2	Cosmetic Science and Technology: Theoretical Principles and Applications, Kazutami Sakamoto, Robert Y. Lochhead, Howard I. Maibach, Yuji Yamashita, 2017, Elsevier.
3	Cosmetic Formulation: Principles and Practice, Heather A.E. Benson, Adam C. Watkinson, 2011, CRC Press.
4	Practical Modern Cosmetic Dermatology, Peter Elsner, Howard I. Maibach, 2012, Springer.

26PY5118 · RW

RESERCH WORK

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester IV	PRI	0-0-32-0	16	32	A ANKA RAO - ankarao@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Review the latest literature in selected area of work	2	PO2 (2), PO4 (2), PSO2 (2)
CO2	Conduct research experiments to meet the aim and objectives of proposed research work	4	PO2 (2), PO4 (2), PSO2 (3)
CO3	Evaluate the findings and plan alterations or new methodologies or procedures for further improvement	5	PO2 (2), PO4 (2), PSO2 (3)
CO4	Document the findings of conducted experiments	2	PO2 (2), PO4 (2), PSO2 (2)
CO5	Interpret the results obtained and summarize the work with a conclusion	4	PO2 (2), PO4 (2), PSO2 (2)
CO6	Interpret the results obtained and summarize the work with a conclusion	2	PO2 (2), PO4 (2), PSO2 (2)

SYLLABUS

Understanding Review the latest literature in selected area of work

Analyze the Conduct research experiments to meet the aim and objectives of proposed research work

Evaluate the findings and plan alterations or new methodologies or procedures for further improvement

Understanding the Document the findings of conducted experiments

Analyze the nterpret the results obtained and summarize the work with a conclusion

Creating the interpret the results obtained and summarize the work with a conclusion

REFERENCE BOOKS

#	Reference
1	ournal of controlled release Journal of drug delivery science and technology DDIP IJP, y w chein, 2, elsevier.
2	Journal of advanced drug delivery system, robinson, 2, elseevier.
3	Journal of drug delivery technology, Prof. Dr. Florence Siepman, 2, sciiencedirect.
4	Journal of advanced systems, robinson, 4, science.
5	Journal of advanced controlled systems, robinson, 2, elsevier.

26PY5119 · D/P-II

DISCUSSION/FINAL PRESENTATION

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Semester IV	SDC	0-0-6-0	3	6	SIVADASU PRAVEEN - praveen.sivadasu@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Interpret the observations and results	2	PO2, PSO2
CO2	Develop the presentation in an organized manner	2	PO2, PSO2
CO3	Explain the followed methods and results	4	PO2, PSO2
CO4	Defend the questions from experts and peers	4	PO2, PSO2

SYLLABUS

To know the methods to interpret the observation and results obtained during the research work

Methods to develop an organized presentation for the performed research work

Methods to explain the methods followed and the obtained results in the performed research work

Methods to defend the questions raised from various experts and peers

REFERENCE BOOKS

#	Reference
1	Journal of Drug Delivery Science and Technology, Florence Siepmann, 97 (2024), Elsevier.
2	Drug delivery , Moein Moghimi, 31 (2024), Taylor and Francis .
3	Current drug delivery , Ricardo J. Dinis-Oliveira, 21 (2024), Bentham Science.
4	AAPS Pharma Sci tech, Robert O Williams III, 25 (2024), Springer Nature .

26PY5120 · CCA

CO-CURRICULAR ACTIVITIES (ATTENDING CONFERENCE, SCIENTIFIC PRESENTATIONS AND OTHER SCHOLARLY ACTIVITIES)

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
Programme-wide	SDC	0-0-8-0	4	8	M KASI VISWANADH - mkasiviswanadh@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Apply for external scientific/technical programs like conferences/seminars/symposia, Present their technical or research work	3	PO2, PO4
CO2	Application of skills in presenting their technical or research work	3	PO2, PO4
CO3	Application of various tools and software in writing scientific papers, articles and presentations	3	PO2, PO4
CO4	Apply team management tasks and networking	3	PO2, PO4

SYLLABUS

procedure for preparing slides, posters for presention in conferences, seminars and scientific sessopns

introduction to scientific papers. articles, journals, indexing, impact factor, h-index, i-10 index, plagiarism, how to prepare a manuscript

Performing scientific paper writing and critical thinking, interpretation of research/review data

Management skills in Pharmacy, team coordination, networking with others

REFERENCE BOOKS

#	Reference
1	Novel Drug Delivery Systems, Y W. Chien, , 2, Marcel Dekker, Inc .
2	Encyclopedia of Controlled Delivery , Edith Mathiowitz , 2, Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim .
3	Controlled Drug Delivery -concepts and advances , S.P. Vyas and R.K. Khar , 4, Vallabh Prakashan, New Delhi .
4	Controlled and Novel Drug Delivery , N.K. Jain , 5, CBS Publishers& Distributors, New Delhi .

BASE SAS

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
-	VAC	0-0-0-8	0	8	NADEEM SIDDIQUI - siddiqui@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Apply the role of SAS Programming for Biotechnology	3	PO2, PO4
CO2	Apply the concepts of SAS Programming for Biotechnology Applications	3	PO2, PO4

SYLLABUS

Introduction to SAS, Data Import and Export, Data Step Processing, Data Manipulation and Cleaning, Introduction to PROC Steps, Basic Data Visualization

Advanced Data Step Techniques, Advanced PROC Procedures, Macro Programming, Data Analysis and Interpretation, Clinical Trials and Biostatistics, Case Studies and Project

REFERENCE BOOKS

#	Reference
1	The Little SAS Book: A Primer, Lora D. Delwiche, Susan J. Slaughter, 2019, SAS Institute.
2	Learning SAS by Example: A Programmer's Guide, Ron Cody, 2018, SAS Institute.
3	SAS Certification Prep Guide: Base Programming for SAS 9, SAS Institute, 2011, SAS Institute.
4	SAS Programming for Researchers and Social Scientists, Paul D. Allison, 2010, SAS Institute.

26CC3069 · PCV

PHARMACOVIGILANCE

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
-	VAC	0-0-0-8	0	8	-

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Apply pharmacovigilance principles and methodologies to monitor and assess the safety of pharmaceutical products throughout their lifecycle, implementing the foundational principles of pharmacovigilance	3	PO3, PO4
CO2	Apply the concept of adverse drug reactions (ADRs) and assess their potential impact on public health, regulatory decisions, and patient care, nature, classification, and evaluation of adverse drug reactions (ADRs).	3	PO3, PO4

SYLLABUS

Introduction to Pharmacovigilance Overview of Pharmacovigilance Principles: Introduction to the field of pharmacovigilance, including the definition, objectives, and importance of monitoring drug safety throughout the lifecycle of medications. Regulations in Pharmacovigilance: Examination of global and regional regulations governing pharmacovigilance practices, including guidelines from agencies such as the FDA, EMA, and ICH.

Adverse Drug Reaction Monitoring and Analysi: In-depth study of adverse drug reactions (ADRs), including their identification, assessment, and reporting procedures. Detailed examination of methods for identifying ADRs, including patient interviews, clinical observations, and the use of safety reporting systems.Techniques for assessing the causality, severity, and outcome of ADRs, including the use of assessment scales, causality algorithms, and severity grading systems.

REFERENCE BOOKS

#	Reference
1	"Pharmacovigilance: Principles and Practice", Patrick Waller , 2011, John Wiley & Sons.
2	"Practical Aspects of Signal Detection in Pharmacovigilance", Harald Herkner, Klemens Wallner, 2018, Springer.
3	"Introduction to Pharmacovigilance", Patrick Waller , 2012, Pharmaceutical Press.
4	Textbook of Pharmacovigilance: Ensuring the Safe Use of Medicines, SK Gupta, 2022, Jaypee Brothers Medical Publishers.

26CC3077 · RGA

REGULATORY AFFAIRS

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
-	VAC	0-0-0-8	0	8	NADEEM SIDDIQUI - siddiqui@kluniversity.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Apply the roles and functions of major regulatory agencies	3	PO3, PO4
CO2	Apply the regulatory environment and key legislation that governs pharmaceuticals, biologics, and medical devices	3	PO3, PO4
CO3	Apply the concepts of quality control and assurance processes to ensure trial integrity and compliance	3	PO3, PO4

SYLLABUS

Fundamentals of Regulatory Affairs: Introduction to Regulatory Affairs, Regulatory Bodies and Legislation, Drug Development and Approval Process, Clinical Trials and Good Clinical Practice (GCP), Regulatory Submissions and Documentation, Quality Assurance and Compliance, Post-Market Surveillance and Pharmacovigilance

Advanced Topics in Regulatory Affairs: International Regulatory Affairs, Medical Devices and Combination Products, Biologics and Biosimilars, Regulatory Affairs in Emerging Markets, Orphan Drugs and Rare Diseases, Over-the-Counter (OTC) Products and Dietary Supplements, Advanced Regulatory Strategies and Project Management

REFERENCE BOOKS

#	Reference
1	Fundamentals of US Regulatory Affairs, Regulatory Affairs Professionals Society (RAPS), 2019, Regulatory Affairs Professionals Society (RAPS).
2	FDA Regulatory Affairs: A Guide for Prescription Drugs, Medical Devices, and Biologics, Douglas J. Pisano, David S. Mantus, 2014, CRC Press.
3	European Regulatory Affairs: Guide for Successful Registration of Medicinal Products in Europe, Regulatory Affairs Professionals Society (RAPS), 2010, Regulatory Affairs Professionals Society (RAPS).
4	Essentials of Pharmaceutical Regulatory Affair, Douglas Pisano, David Mantus, 2003, CRC Press.

CAREER ADVANCEMENT:COMPETITIVE EXAM TRAINING

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
-	AUC	0-0-0-8	0	8	-

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Enhance critical thinking and problem-solving skills to analyze and solve complex problems effectively.	3	PO4
CO2	Apply strategic test-taking techniques to improve performance and manage exam- related stress.	3	PO4

SYLLABUS

Introduction to Critical Thinking: covering the definition, importance, and key components; Logical Reasoning: focusing on types of reasoning (deductive and inductive) and common logical fallacies; Data Interpretation: analyzing graphs, charts, and statistical information; and Problem-Solving Techniques: emphasizing creative problem-solving methods and structured frameworks.

Practice Sessions through case studies and group discussions. It also explores Understanding Exam Formats, providing an overview of common competitive exams such as GRE, GMAT, and UPSC, along with types of questions encountered. Students will learn Time Management Techniques for prioritizing questions and allocating time efficiently, alongside Effective Study Habits to create study schedules and utilize resources. The syllabus includes Stress Management Strategies, focusing on mindfulness and relaxation techniques, and concludes with Mock Exams and Feedback to assess performance and identify areas for improvement.

REFERENCE BOOKS

#	Reference
1	Critical Thinking: A Beginner's Guide, Gail McDonald, Springer, 2018.
2	The 7 Habits of Highly Effective People, Stephen R. Covey, Free Press, 2020.

CADCORL1V1 · TICD

CAREER ADVANCEMENT: TRAINING IN CORE DOMAIN

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
-	AUC	0-0-0-8	0	8	-

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Apply advanced domain-specific concepts and emerging trends to address industry challenges and innovations.	3	PO1
CO2	Apply advanced problem-solving and strategic decision-making techniques to manage complex projects within the core domain.	3	PO1

SYLLABUS

Core Concepts, theories, and frameworks of the specific domain (e.g., finance, IT, healthcare, engineering), Advanced Domain-Specific Tools, innovations and their impact on the core domain, Real-world examples of how new trends are being applied within the domain

Domain specific challenges, Practical exercises to resolve complex issues in the domain, best practices for managing projects within the domain, Case Studies and Simulations.

CAREER ADVANCEMENT:ENTREPRENEURIAL CAREER PATHWAY TRAINING

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
-	AUC	0-0-0-8	0	8	-

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	apply essential entrepreneurial qualities such as resilience, innovation, and risk- taking, enabling them to pursue entrepreneurial career paths in various contexts, including startups, corporate roles, and freelancing.	3	PO2
CO2	Develop the skills to recognize potential business opportunities, conduct thorough market research, and validate ideas by addressing customer needs and evaluating feasibility, preparing them to create sustainable business solutions.	3	PO2

SYLLABUS

Defining entrepreneurship: What it means to be an entrepreneur; The distinction between entrepreneurial and traditional career paths; The entrepreneurial mindset: resilience, risk-taking, innovation, and adaptability; Exploring entrepreneurial career pathways in startups, corporate environments, freelancing, and social ventures.

Spotting opportunities: How to find unmet needs and gaps in the market; Market research: Tools and techniques for understanding trends and customer needs; Idea validation: Testing the feasibility of your business idea; Problem-solving for innovation: Leveraging customer pain points and inefficiencies.

REFERENCE BOOKS

#	Reference
1	The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses, Eric Ries, 1st (2011), Crown Business.
2	The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company, Steve Blank, Bob Dorf, 2nd (2020), K&S Ranch Press.
3	Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers, Alexander Osterwalder, Yves Pigneur, 1st (2010), Wiley.
4	The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail, Clayton M. Christensen, 1st (1997), Harvard Business Review.

CAREER ADVANCEMENT: UPSC-CIVIL SERVICES EXAM TRAINING

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
-	AUC	0-0-0-8	0	8	-

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Understanding the basics of Indian History and it\'s evolution	2	PO3
CO2	Understanding the basics of Indian Geography	2	PO3
CO3	Understanding the Evolution of Indian Constitution.	2	PO3
CO4	Understanding the evolution of Indian Economy	2	PO3

SYLLABUS

Ancient Indian History- IVC,Rig Vedic, Later Vedic, Buddhism, Jainism, Mahajanapadas, Mouryan Empire, Guptan Empire, Harshavardhana empire, Sangam Age.

Exploring The Physical and Social Geography of India: The Universe, Big Bang Theory, Solar system, Geological Time Scale, Earth\'s Interior, Earth\'s Magnetic Feild.

Indian Polity and Constitution: Sailent featuresof Indian constitution, Preamble, Fundamental RIghts, Directrive Principles of State Policy, Fundamental Duties , Indian Parliament.

Understanding India\'s Economy - Indian Economic Development, National Income, Public Finance, Indian Budget.

REFERENCE BOOKS

#	Reference
1	Indian Polity, M. Laxmikanth, 7, Tata Mc Graw Hill.
2	Indian Economy, Nitin Singhania, 5, Mc Graw Hill.
3	Ancient and Medieval India, Poonam Dalal Dahiya, 3, Mc Graw Hill.
4	Fundamentals of Physical Geography, Husain Majid, 5, Mc Graw Hill.

CRTCODL1V1 · LBST

CAMPUS RECRUITMENT: LOGIC BUILDING SKILLS TRAINING

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
-	AUC	0-0-0-8	0	8	-

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Apply logical principles and critical thinking skills to analyze and evaluate arguments, solve problems, and make informed decisions.	3	PO4
CO2	Identify various logical reasoning techniques to solve complex problems, identify patterns, and draw valid conclusions	3	PO4

SYLLABUS

Introduction to Logic and Critical Thinking: fundamentals of logic, including the concepts of statements, propositions, truth values, logical connectives (AND, OR, NOT, IF-THEN, IF-AND-ONLY-IF), truth tables, and logical equivalence. Students will learn to identify and analyze different types of arguments, including deductive and inductive reasoning. They will also develop critical thinking skills, such as evaluating evidence, identifying assumptions, and recognizing fallacies

Logical Reasoning and Problem-Solving: applying logical reasoning techniques to solve various types of problems. Students will learn about different problem-solving strategies, including problem decomposition, pattern recognition, working backward, and using analogies. They will practice solving logic puzzles, brain teasers, and real-world problems that require logical thinking. Additionally, students will explore the concepts of syllogisms, Venn diagrams, and conditional reasoning to enhance their problem-solving abilities

REFERENCE BOOKS

#	Reference
1	Introduction to Logic, Irving M. Copi, Carl Cohen, Victor Rodych, 2014, Routledge.
2	Critical Thinking, Richard Paul, Linda Elder, 2019, Pearson.
3	The Art of Logical Thinking; Or, The Laws of Reasoning, William Walker Atkinson, 2013, Public domain in the
4	Symbolic logic and The game of logic, Carroll, Lewis, 1958, Dover Publications.

CRTCSSL1V1 · CST

CAMPUS RECRUITMENT: COMMUNICATION SKILLS TRAINING

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
-	AUC	0-0-0-8	0	8	MS. N M DEEPIKA - nmdeepika@klh.edu.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	apply knowledge of communication of different types and techniques while analyzing body language and tone to enhance overall communication effectiveness. apply active listening and feedback techniques, and analyzing effective participation	3	PO2
CO2	in group discussions, while exploring roles in teamwork and strategies for managing conflicts, alongside professional communication practices such as writing emails and conducting meetings.	3	PO2

SYLLABUS

Communication: Basics, significance, types, verbal & non-verbal communication techniques, effective speaking and presentation skills tone and pacing in verbal interactions

Interpersonal skills, listening skills, feedback techniques, group communication and dynamics, group discussion, conflict management in professional communication, E-mail writing, report writing, presentations, interview skills.

REFERENCE BOOKS

#	Reference
1	Business Communication: A Problem-Solving Approach, Louis E. Boone & David L. Kurtz, 3rd Edition, McGraw Hill Education.
2	The Complete Guide to Business School Presentations", Jennifer D. D. McDonald, 2nd Edition, Pearson.
3	Listening: The Forgotten Skill", Geoffrey M. Cohen, 1st Edition, University Press of America.
4	Business Communication: Process and Product", Mary Ellen Guffey & Dana Loewy, 8th Edition, Cengage Learning.
5	Effective Communication Skills" Author, John Adair, 2nd Edition, Pan Macmillan.

CRTCSSL2V2 · SST

CAMPUS RECRUITMENT: SOFT SKILLS TRAINING

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
-	AUC	0-0-0-8	0	8	MS. N M DEEPIKA - nmdeepika@klh.edu.in

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	applyi and practice empathy, critical thinking, problem-solving, decision-making, effective communication, and interpersonal skills through real-life scenarios and interactive activities.	3	PO4
CO2	apply group discussion techniques, interview skills, and mock interviews through practical exercises, encouraging learners to practice and refine these skills in realistic settings.	3	PO4

SYLLABUS

Critical thinking, problem soving, decision making, communication skills, interpersonal skills

Grooming, group discussions, story narrations, interview skills, mock interviews

REFERENCE BOOKS

#	Reference
1	Personality Development and Soft Skills", Barun K. Mitra, 2nd Edition, Oxford University Press.
2	Communication Skills for Engineers", C. Muralikrishna & Sunita Mishra, 1st Edition, Pearson Education.
3	Developing Soft Skills", Robert L. Katz, 1st Edition, McGraw Hill Education.

CRTVQRL1V1 · VAT

CAMPUS RECRUITMENT: VERBAL APTITUDE TRAINING

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
-	AUC	0-0-0-8	0	8	-

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	apply and practice grammatical concepts like sentence formation, identifying odd words, using one-word substitutions, while enhancing understanding of idioms, phrases, spellings, and structures.	3	PO4
CO2	apply concepts like paragraph formation, sentence completion, reading comprehension, sentence correction, and correcting jumbled sentences, while enhancing word selection and sentence structure accuracy.	3	PO4

SYLLABUS

Synonyms, Antonyms, odd words, parts of speech, idioms and phrases, one word substitutions, odd words, formation of sentences

sentence completion, sentence correction, jumbled sentences, paragraph formation, reading comprehension, and sentence selection

REFERENCE BOOKS

#	Reference
1	The Pearson Guide to Verbal Ability and Logical Reasoning for the CAT", Nishit K. Sinha, 2nd Edition, Pearson.
2	Objective General English", S.P. Bakshi, 3rd Edition, Arihant Publications.
3	English Grammar in Use", Raymond Murphy, 5th Edition, Cambridge University Press.

CRTVQRL2V2 · QAT

CAMPUS RECRUITMENT: QUANTITATIVE APTITUDE TRAINING

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
-	AUC	0-0-0-8	0	8	-

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Apply principles of quantitative techniques to solve problems on Simple Equations, Simple & Compound Interest etc	3	PO4
CO2	Apply principles of quantitative techniques to solve problems on Divisibility, Functions, Surds & Indices etc	3	PO4

SYLLABUS

Simple Equations, Problem on Ages, Ratio & Proportion, Variation& Partnership, Percentages, Profit, Loss& Discounts, Simple & Compound Interest, Averages & Allegations or Mixtures

Numbers, Divisibility, Decimal Fractions, LCM & HCF, Simplification, Sequence, Series & Progressions, Linear Algebra, Quadratic Equations & Inequalities, Theory of Equations. Sets, Relations & Functions, Surds & Indices, Logarithms

REFERENCE BOOKS

#	Reference
1	Quantitative Aptitude by R.S. Agarwal, SCHAND Publications, R.S. Agarwal, 2021, SCHAND Publications.
2	A Modern Approach to Verbal Reasoning by R.S. Agarwal, SCHAND Publications, R.S. Agarwal, 2021, SCHAND Publications.

CRTVQRL3V3 · RAT

CAMPUS RECRUITMENT: REASONING APTITUDE TRAINING

Semester	Category	L-T-P-S	Credits	Hours	Course coordinator
-	AUC	0-0-0-8	0	8	-

COURSE OUTCOMES

CO	Description	BTL	PO / PSO
CO1	Apply principles of deductive logic to solve problems on syllogisms, Venn diagrams, etc	3	PO4
CO2	Apply principles of inductive logic to solve problems on assumptions and conclusions	3	PO4

SYLLABUS

Syllogism, Number& letter series, Number, letter & word Analogy, Odd man out, coding & decoding, Cubes & Dice, Logical Venn Diagrams

Statements & conclusions, statements & Arguments (Critical Reasoning), statements & Assumptions, logical connectives, Binary logic

REFERENCE BOOKS

#	Reference
1	A Modern Approach to Verbal Reasoning, R.S. Agarwal, 2022, SCHAND Publications.
2	Logical Reasoning for CAT, Arun Sharma, 2021, McGraw Hills.

Terminology & FAQs

Frequently asked questions

Question	Answer
s Q:What is the Choice-Based Credit System (CBCS) and how does it work?	CBCS allows student to choose courses from various categories based on your interests and career goals. Each course has a credit value assigned to it, and you need to earn a minimum number of credits in each category and in total to complete your program.
Can I choose electives based on my interests?	Yes, student has the flexibility to choose electives that align with your personal interests and career objectives.
Can I choose my preferred faculty members for certain courses?	During registrations prior to commencement of each semester, if a course is offered for multiple sections and if multiple faculty are teaching the same course, you will then have a choice of selecting the section being taught by that faculty under whom you wish to study.
When and how do I register for courses?	Student must register for courses on the designated registration day. There is a one-week window for adding courses and a two-week window for dropping or changing them.
Can I get an attendance waiver?	Students with a CGPA and SGPA of 9.00 or higher in the previous semester can get an attendance waiver for up to three courses with prior approval.
What is the minimum attendance requirement for promotion?	80% attendance is required for course promotion and appearing for the semester-end exam.
Are there any extracurricular activities or clubs available?	Yes, KLEF offers various extracurricular activities and clubs, such as sports, cultural events, and student organizations.
What happens if I have less than 80% attendance?	Upto 70% attendance, student may be eligible for condonation or marginal case consideration, but need to provide proper documentation and may be subject to fees. But falling below 70% will make you detain in the course.
What happens if I detain a course?	Student who detained in a course must re-register for the course and study it again in summer term. If the detained course is not offered by the department, then the student can study other equivalent course from the same category upon taking approval from office of Dean Academics.
What is ABC?	ABC enables you to digitally store your earned credits and potentially use them towards future studies at other institutions.
Will I get my degree upon acquiring all the required credits?	Apart from fulfilling the total credit requirement, it is required to fulfill category and sub-category wise credit requirements and outcome requirements (which are clearly mentioned in the degree-wise credit requirements section) to be eligible for award of specific degree.
Can I accelerate or decelerate my studies?	Students are generally recommended to register for 20 to 24 credits in each semester. Students who cannot cope up with such load, may consult their counsellor and Head of the Department to register in lower number of credits. This process is called "Deceleration". Students who do not register on time, may also be forced to decelerate to compensate the classwork that they missed due to late registration. In both the cases of deceleration, permission must be sought from Office of Dean Academics through proper channel. On the contrary, Students who wish to accelerate can register for upto 30 credits by selecting courses that are usually offered in later semesters and complete them in advance. Students may also use the optional Summer Term for accelerating courses upto 12 credits. In Similarly, a student may also register for credits lower than. However, you'll need approval from the Dean of Academics.
Can I register for a course without promoting in its pre-requisite course?	No, student must promote in the pre-requisite course in order to register for a course having pre-requisite.

Terminology

Term	Definition
Terminology Absolute Grading	Absolute grading is a method of assigning grades based on predetermined criteria or standards rather than comparing student performance to other students in the class (See: Relative Grading where the performances are compared).

Term	Definition
Academic Bank of Credits (ABC)	Academic Bank of Credits, an initiative of Government of India, is a digital platform that stores the academic credits earned by a student throughout their educational journey. It's essentially a virtual repository of a student's academic achievements.
Academic Council	The Academic Council is the highest academic body of the University and is responsible for the maintenance of standards of instruction, education and examination within the University. The Academic Council is an authority as per UGC regulations and has the right to decide all academic matters including academic research.
Academic Year	It is the period necessary to complete an actual course of study within a year. It comprises of two consecutive regular semesters i.e., Odd and Even semesters.
Acceleration	Acceleration of courses refers to a student's ability to progress through their academic program at a faster pace than traditional timelines.
Attendance	Attendance refers to the record of a student's presence or absence in educational institutions. It is a critical factor influencing academic performance, overall development, and future success.
Audited Course	It is a course of study which has zero credits and has a "Satisfactory" or an "Unsatisfactory" grade.
Backlog Course	A course is considered to be a backlog if the student has obtained 'F' grade or detained in the course.
Basic Sciences	The courses of foundational nature in the areas of Mathematics, Physics, Chemistry, Biology etc., are offered in this category.
Betterment	Betterment is a way that contributes towards improving the students' grade in any course(s). It can be done by either (a) re-appearing or (b) re-registering for the course.
Board of Studies	Board of Studies (BOS) is an authority as defined in UGC regulations, constituted by Vice Chancellor for each of the department separately. They are responsible for curriculum design and update in respect of all the programs offered by a department.
Branch of Study	It is a branch of knowledge, an area of study or a specific program (like Civil Engineering, Mechanical Engineering, Electrical and Electronics Engineering etc.)
Bridge Courses	Courses which are required to bridge the continuity among the Basic sciences/Engineering Sciences/professional courses (both core and electives) and are identified through gap analysis carried out using feedback obtained from various academic stakeholders are termed as Bridge Courses. These courses also do not yield any credits but require a "Satisfactory" result to register into the attached professional courses.
Capstone Project	A capstone project is the culminating academic experience for many students, typically undertaken in the final year of a degree program. It's designed to integrate and apply the knowledge and skills acquired throughout the course of study.
Certificate course	It is a course that makes a student gain hands-on expertise and skills required for holistic development. It is a mandatory, non-credited course for the award of degree.
Change of Branch	Change of branch means transfer from one's branch of study to another.
Compulsory course	Course required to be undertaken for the award of the degree as per the program.
Course	A course is a subject offered by the University for learning in a particular semester.
Course Handout	Course Handout is a document which gives a complete plan of the course. It contains the details of the course viz. Course title, Course code, Pre-requisite, Credit structure, team of instructors, Course objectives, Course rationale, Course Outcomes and the relevant syllabus, textbook(s) and reference books, Course delivery plan and session plan, evaluation method, chamber consultation hour, course notices and other course related aspects. In essence, course handout is an agreement between students (learners) and the instructor.
Course Outcomes	The essential skills that need to be acquired by every student through a course.
Course Withdrawal	Withdrawing from a Course means that a student can drop from a course within the first two weeks of the odd or even Semester (deadlines are different for summer sessions). However, s/he can choose a substitute course in place of it by exercising the option within 5 working days from the date of withdrawal.
Credit	A credit is a unit that gives weight to the value, level or time requirements of an academic course. The number of 'Contact Hours' in a week of a particular course determines its credit value.
Credit point	It is the product of grade point and number of credits for a course.
Credit Transfer	The procedure of granting credit (s) to a student for course(s) undertaken at another institution.
Cumulative Grade Point Average (CGPA)	It is a measure of cumulative performance of a student over all the completed semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

Term	Definition
Curriculum	Curriculum is a standards-based sequence of planned experiences where students practice and achieve proficiency in content and applied learning skills. Curriculum is the central guide for all educators as to what is essential for teaching and learning, so that every student has access to rigorous academic experiences.
Deceleration	Deceleration of courses typically refers to a student's decision to reduce their course load or extend the time taken to complete a degree program.
Degree	A student who fulfils all the Program requirements is eligible to receive a degree.
Degree Requirements	Degree requirements are the specific courses, credits, and academic standards that a student must fulfill to earn a particular degree.
Degree with Specialization	A student who fulfills all the Program requirements of her/his discipline and successfully completes a specified set of Professional elective courses in a specialized area is eligible to receive a degree with specialization.
Department	An academic entity that conducts relevant curricular and co-curricular activities, involving both teaching and non-teaching staff and other resources.
Designing Your Own Degree	Designing your own degree is a revolutionary concept that empowers students to create a customized educational path aligned with their passions, career goals, and unique learning styles.
Dissertation	Dissertation is a substantial piece of original research written and defended by a candidate for a degree.
Detention in a course	Student who does not obtain minimum prescribed marks in continuous in-semester evaluation and /or minimum prescribed attendance in a course shall be detained in that course.
Double Major Degree	A double major degree allows students to specialize in two academic fields while earning a single bachelor's degree.
Dropping from the Semester	A student who doesn't want to register for the semester should do so in writing in a prescribed format before commencement of the semester.
End-semester Evaluation	End-semester evaluation is a summative assessment conducted at the conclusion of an academic term to measure students' overall performance.
Elective Course	A course that can be chosen from a set of courses. An elective can be Professional Elective, Open Elective, Management Elective and Humanities Elective.
Engineering Sciences	The courses belonging to basic evolutionary aspects of engineering from Mechanical Sciences, Electrical Sciences and Computing like Engineering Mechanics, Data structures, Network Theory, Signal Analysis.
EPICS	EPICS stands for Engineering Projects in Community Service. It's a unique program that combines engineering education with community service.
Evaluation	Evaluation is the process of judging the academic work done by the student in her/his courses. It is done through a combination of continuous in-semester assessment and semester end examinations.
Experiential Learning	Experiential learning is a process through which students develop knowledge, skills, and values from direct experiences outside a traditional academic setting. It involves learning by doing, where students engage in hands-on activities, real-world problem-solving, and reflective practices to gain deeper understanding and practical application of the concepts they are studying.
Flexi-Core course	A Flexi-Core course typically refers to an elective or optional course within a degree program that offers students flexibility in choosing subjects based on their interests and career goals.
Formative Assessment	Formative assessment is ongoing evaluation of student understanding to inform instruction and facilitate learning.
Flipped Learning	Flipped learning is an instructional strategy that reverses the traditional teaching model. In flipped learning, students are introduced to new content outside of class, usually through video lectures, readings, or other materials. The in-class time is then used for more interactive activities, such as discussions, problem-solving, group work, and applying the concepts learned at home.
Grade	It is an index of the performance of the students in a said course. Grades are denoted by alphabets.
Grade Point	It is a numerical weight allotted to each letter grade on a 10 - point scale.
Grade Point Average (GPA)	Grade Point Average is a numerical representation of a student's academic performance. It is calculated by averaging the numerical equivalents of letter grades earned in courses, considering the number of credit hours for each course.
Honors Degree	A student who fulfills all the Program requirements of her/his discipline and successfully completes a specified set of additional courses within the same program is eligible to receive an Honors degree.

Term	Definition
Industrial Training	Training program undergone by the student as per the academic requirement in any company/firm.
Industrial Visit	Visit to a company/firm as per the academic requirement.
Internship	Internship is a temporary work experience offered by an organization for a limited period. It provides students, graduates, or career changers with an opportunity to gain practical skills and experience in a specific field.
In-Semester Evaluation	Summative assessments used to evaluate student learning, acquired skills, and academic attainment during a course.
Induction Courses	Student who gets admitted into B.Tech. program must complete a set of Induction courses for a minimum period of 3 weeks and obtain a "Satisfactory" result prior to registering into 1st Semester of the Program.
Innovation Semester	An Innovation Semester is a dedicated academic term focused on cultivating a culture of creativity, problem-solving, and entrepreneurial thinking.
Lecture	A lecture is a formal instructional session where an instructor presents information to a large group of students.
Make-up Test	An additional test scheduled on a date other than the originally scheduled date.
Malpractice	Malpractice typically refers to academic dishonesty or misconduct during examinations or coursework. This can include a wide range of behaviors that compromise the integrity of the evaluation process.
Management elective	A course that develops managerial skills and inculcates entrepreneurial skills.
Minor Degree	A student who fulfills all the Program requirements of her/his discipline and successfully completes a specified set of courses from another discipline is eligible to receive a minor degree in that discipline.
Multiple Entry and Multiple Exit (MEME)	It is an educational framework designed to provide flexibility in learning pathways, allowing students to enter and exit educational programs at various stages based on their individual needs, prior knowledge, and career goals.
National Education Policy (NEP)	NEP 2020 is a comprehensive framework for transforming India's Education System. It aims to create an equitable and vibrant knowledge society by providing high-quality education to all.
NHEQF	NHEQF stands for National Higher Education Qualifications Framework. It's a comprehensive framework designed to standardize and classify higher education qualifications in India. The primary goal of NHEQF is to ensure that qualifications from different institutions are comparable and recognized nationally and internationally.
Open Elective	This is a course of interdisciplinary nature. It is offered across the University for all Programs.
Overloading	Registering for more number of credits than normally prescribed by the Program in a semester.
Peer Learning	Peer learning is a collaborative learning process where students learn from each other. It involves sharing knowledge, skills, and experiences among peers.
Practical	A practical is a hands-on session where students apply theoretical knowledge in a real-world or laboratory setting. Practical sessions are designed to develop students' technical skills, problem-solving abilities, and understanding of experimental procedures.
Practice School	It is a part of the total program and takes one full semester in a professional location, where the students and the faculty get involved in finding solutions to real-world problems. A student can choose Project/Practice School during his/her final year to meet the final requirements for the award of degree.
Pre-requisite	A course, the knowledge required for registration into higher level course.
Product Development Semester	A Product Development Semester is an academic term dedicated to the process of creating new products or improving existing ones.
Professional Core	The courses that are essential constituents of each engineering discipline are categorized as Professional Core courses for that discipline.
Professional Elective	A course that is discipline centric. An appropriate choice of minimum number of such electives as specified in the program will lead to a degree with specialization.
Program	A set of courses offered by the Department. A student can opt and complete the stipulated minimum credits to qualify for the award of a degree in that Program.
Program Educational Objectives	The broad career, professional, personal goals that every student will achieve through a strategic and sequential action plan.
Program Outcome (PO)	Program outcomes are statements that describe what students are expected to know, understand, and be able to do upon completing a specific academic program.

Term	Definition
Project	Course that a student must undergo during his/her final year which involves the student to undertake a research or design, which is carefully planned to achieve a particular aim. It is a credit-based course.
Project-Based Learning (PBL)	Project-Based Learning is an instructional approach where students actively engage in real- world and personally meaningful projects.
Rapid Prototyping Semester	A Rapid Prototyping Semester is an academic term dedicated to the practical application of rapid prototyping techniques to create physical models or prototypes of products or designs.
Registration	Process of enrolling into a set of courses in a semester/ term of the Program.
Re-Registration	Student who are detained in courses due to attendance or marks criteria as per their regulation are given a chance to re-register for the same and complete it during the summer term.
Relative Grading	Relative grading is a method of assigning grades based on a student's performance compared to the rest of the class.
Remedial Exam	A remedial Exam is an assessment designed to identify specific areas of weakness or gaps in a student's knowledge or skills. It is typically administered after a student has performed poorly on a regular assessment.
Research Project	A research project is a systematic investigation undertaken to answer a specific question or address a particular problem.
Research Semester	A research semester is a dedicated period within an academic program focused on independent research or scholarly inquiry.
Research Seminar	A research seminar is a formal academic gathering where researchers present their ongoing work to a group of peers, faculty, and other interested individuals.
Self-learning	Self-learning is the process of acquiring knowledge and skills independently without formal instruction.
Semester	It is a period of study consisting of 15+1 weeks of academic work equivalent to normally 90 working days including examination and preparation holidays. The odd Semester starts normally in July and even semester in December.
Semester End Examinations	It is an examination conducted at the end of a course of study.
Skilling	It is a process of developing and enhancing specific skills that are essential for performing particular tasks or activities effectively. It involves structured training and practice aimed at equipping individuals with the practical abilities, knowledge, and competencies required for professional success and personal development.
Social Immersive Learning (SIL)	Social Immersive Learning is a pedagogical approach that combines the power of social interaction with immersive technologies to create engaging and impactful learning experiences. Social Service: An activity designed to promote social awareness and generate well-being; to improve the life and living conditions of society.
Student Outcomes	The essential skill sets that need to be acquired by every student during her/his program of study. These skill sets are in the areas of employability, entrepreneurial, social and behavioral.
Substitution of Elective course	Replacing an elective course with another elective course as opted by the student.
Summative Assessment	Summative Assessment is a type of evaluation that occurs at the end of a learning period.
Summer term	The term during which courses are offered from May to July. Summer term is not a student's right and will be offered at the discretion of the University.
Supplementary	A student can reappear only in the semester end examination for the Theory component of a course, subject to the regulations contained herein.
Term paper	A 'term paper' is a research report written by students that evolves their course-based knowledge, accounting for a grade. Term paper is a written original research work discussing a topic in detail. It is a credit-based course.
Tutorial	A tutorial is a small group session designed to provide personalized guidance and support to students. Tutorials often involve discussions, problem-solving activities, and hands-on practice to reinforce concepts learned in lectures.
Under-loading	Registering for lesser number of credits than normally prescribed for a semester in that Program.
Value-Added Courses	Courses leading to global certification and those which are conducted exclusively for employability are referred to as value added courses.

Sources & Notes

Regulations, programme outcomes, course outcomes, Bloom's levels, outcome mappings, reference lists and course coordinators are taken from the KLEF M.Pharm (Pharmaceutics) programme handbook. The unit-wise syllabus for the Professional Core courses is taken from the Pharmacy Council of India M.Pharm syllabus under the Credit Based Semester System.

Where	Note
Course codes	Course codes have been transitioned from the Y25 prefix to Y26: 25PY->26PY and 25CC->26CC. Course numbers are unchanged. The audit-course codes (CRT..., CAD...) carry no year prefix in the handbook and are left as they are.
Semester allocation	The Y25 programme structure table has no semester column. Semesters here are derived from the PCI course-of-study tables (Table 2 for MPH, Tables 12 and 13 for the research semesters), matched course by course. Co-curricular Activities is shown as programme-wide, per PCI Table 14.
Syllabus content	For the eleven Professional Core courses the unit-wise syllabus is reproduced from the PCI document, including the hours per unit, which the handbook omits. The handbook's own syllabus text is retained alongside it for every such course.
26PY5108 Advanced Biopharmaceutics and Pharmacokinetics	The handbook text covers roughly a third of PCI Unit 3 (compartment modelling, non-linear pharmacokinetics, drug interactions). The full PCI unit is restored here.
26PY5103 Modern Pharmaceutics	The handbook condenses PCI Units 2 and 5. The full PCI units are restored here.
26PY5102 Drug Delivery Systems	The handbook prints the transdermal and protein/peptide paragraphs twice, and CO1 refers to pilot plant and scale-up, which is not part of this syllabus in either document.
26PY5116 / 26PY5118 Research Work	Titled "RESERCH WORK" in the handbook. CO5 and CO6 are identical in both courses, and 26PY5116 CO6 begins with a stray "I".
Acronyms	26PY5103 Modern Pharmaceutics and 26PY5107 Molecular Pharmaceutics both use the acronym MP.
Articulation matrix	The handbook matrix covers the Professional Core and Project Research courses only; the seven Skill Development courses and the value-added and audit courses are absent from it.
Contact hours	KLU restates PCI's contact hours to suit its 0.5-credit-per-practical-hour rule (Journal Club 1->2, Seminar 7->8, Semester IV Research Work 31->32). Credit points are unchanged, and the change removes an inconsistency in PCI Table 13, where 31 hours is printed as 16 credit points.
Attendance condonation	The clause names the "Principal, College of Engineering".