Competency-Based Dynamic Curriculum for MD/ MS Unani

(PRESCRIBED BY NCISM)

Semester II

Applied Basics of Ilmul Advia

(Materia Medica, Pharmacology and Pharmacognosy)

(SUBJECT CODE : UNIPG-AB-IA)

(Applicable from 2024-25 batch, from the academic year 2024-25 onwards until further notification by NCISM)

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Preface

Ilmul Advia (Unani Pharmacology) is a multidisciplinary field that combines drug development principles with the treatment of human ailments, drawing from areas such as botany, phytochemistry, pharmacognosy, and philosophy. It emphasizes logic and evidence-based reasoning to improve healthcare practices. The curriculum for Ilmul Advia is designed with a competency-based approach, developed through the collaboration of experts in Unani medicine, botany, and modern pharmacology. The syllabus aligns with contemporary educational methodologies and focuses on fostering cognitive, psychomotor, and affective skills to develop highly competent postgraduate students.

The syllabus incorporates key principles of Unani pharmacotherapy, such as Mizāj, Akhlāt, and Quwwa, alongside practical aspects like drug actions, use, and standardization. It emphasizes the treatment of chronic diseases (Muzmin Amrāz) and includes the concepts of Ilaj bi'l Ḍidd (treatment through opposites) and Kamiyat (dosage). Moreover, the syllabus addresses the identification, purification, and biological actions of natural products, such as plants, metals, minerals, and animal-based substances, providing a comprehensive understanding of Unani pharmacology.

The curriculum not only aims to develop research and entrepreneurial skills but also fosters ethical and moral responsibility, preparing students to contribute to society's welfare. It integrates theoretical learning with experiential activities to make the educational experience more engaging and relevant. Overall, the syllabus is designed from the student's perspective, aiming to nurture skilled specialists capable of advancing both Unani medicine and broader healthcare practices.

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NCISM
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Competency-Based Dynamic Curriculum for MD/ MS Unani
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Summary & Credit Framework
Semester II

Module Number & Name	Credits	Notional Learning Hours	Maximum Marks of assessment of modules (Formative Assessment)
M 1. ادویائی مشاہدات کے روایتی طریقے اور یونانی ادویہ کی معیار بندی (Classical methods of drug observation and Standardization of Unani Drugs)	2	60	50
M 2. ادویہ کی معیار بندی میں تجزیاتی تکنیک اور آلہ جاتی طریقوں کا استعمال (Analytical Techniques and Instrumental Methods Used in Drug Standardization)	2	60	50
M 3. ادویہ مفردہ اور ادویہ مرکبہ کی معیار بندی (عرق، معجون، سفوف، قرص، حب، روغن، مراہم، ضماد) (Standardization of Single and Compound Formulations (Arq, Majoon, Safoof, Sharbat, Qurs, Habb, Roghan, Marham & Zimad)	2	60	50
M 4. تجرباتی علم الادویہ کے مبادیات (Essentials of Experimental Pharmacology)	2	60	50
M 5. ادویائی چھان بین, حیاتیاتی جانچ اور دیگر طریقہ کار (Pharmacological Screening, Bioassay and Alternative Models)	2	60	50
M 6. علم السموم-متعلقہ ضابطہ و قوانین اور ان کے مبادیات (Fundamentals of Regulatory Toxicology)	2	60	50
M 7. ذی حیات میں ادویائی افعال و خواص کے چھان بین کے طریقے (In-vivo Methods of Drug Screening)	2	60	50
M 8. تحقیقاتی رپورٹ اور سائنسی و علمی تحریر (Scientific Writing and Research Reporting)	2	60	50
	16	480	400

Credit frame work UNIPG-AB-IA consists of 8 modules totaling 16 credits, which correspond to 480 Notional Learning Hours. Each credit comprises 30 hours of learner engagement, distributed across teaching, practical, and experiential learning in the ratio of 1:2:3. Accordingly, one credit includes 5 hours of teaching, 10 hours of practical training, 13 hours of experiential learning, and 2 hours allocated for modular assessment, which carries 25 marks.

Important Note: The User Manual MD/MS Unani is a valuable resource that provides comprehensive details about the curriculum file. It will help you understand and implement the curriculum. Please read the User Manual before reading this curriculum file. The curriculum file has been thoroughly reviewed and verified for accuracy. However, if you find any discrepancies, please note that the contents related to the MSE should be considered authentic. In case of difficulty and questions regarding the curriculum, write to syllabus24uni@ncismindia.org.

Course Code and Name of Course

Course code	Name of Course
UNIPG-AB-IA	Applied Basics of Ilmul Advia (Materia Medica, Pharmacology and Pharmacognosy)

Table 1 : Course learning outcomes and mapped Program learning outcomes

CO No	A1 Course learning Outcomes (CO) UNIPG-AB-IA At the end of the course UNIPG-AB-IA, the students should be able to	B1 Course learning Outcomes mapped with program learning outcomes.
CO 1	Demonstrate authoritative understanding and application of basic and advanced concepts of Ilmul Advia	PO1,PO3,PO5
CO 2	Appreciate the importance of the Ilmul Advia in the context of the health needs of the community and the national health priorities	PO3,PO5,PO7,PO8
CO 3	Apply contemporary advances, scientific and technological developments, and standardization methods to enhance the understanding and practice in the field of Ilmul Advia.	PO4,PO5,PO6,PO7,PO8
CO 4	Plan and advise therapeutic as well as dietary measures for preventive health and rehabilitation of patients suffering from disease and disability	PO1,PO2,PO3,PO4
CO 5	Design, develop, and carry out experimental high-quality research in both preclinical and clinical domains of Ilmul Advia	PO4,PO5,PO6,PO7,PO8
CO 6	Disseminate scientific knowledge through various Information, Education, and Communication (IEC) methods	PO4,PO5,PO6,PO8
CO 7	Demonstrate effective leadership as a part of multidisciplinary team engaged in healthcare, research or industrial exposure.	PO3,PO4,PO5,PO6,PO7,PO8
CO 8	Develop into a socially responsible professional by embracing and applying ethical principles in practice	PO1,PO3,PO6,PO7,PO8

Table 2 : Course contents (Modules- Credits and Notional Learning Hours)

2A Module Number	2B Module & units	2C Number of Credits	Notional Learning Hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
1	**M-1 ادویاتی مشاہدات کے روایتی طریقے اور یونانی ادویہ کی معیار بندی (Classical methods of drug observation and Standardization of Unani Drugs)** The module deals with the techniques and innovations used by the Unani scholars concerning drug formulation & drug evaluation. The student will get to know about the methods employed in the standardization of Unani drugs. This module involves imparting the skills and principles for carrying out the different tests used for establishing the standards of quality of Unani drugs. The module reviews the classical literature that mentions the quality assessment of Unani drugs. Further, applied knowledge concerning performing preliminary phytochemical analysis of crude drugs of Unani medicine has been included to integrate the quality standards in Unani literature with the parameters followed presently. • **M1.U1** ادویہ کی ترکیب وصناعت میں حکیم طاراسرائیلی کا مشاہداتی طریقہ (Attar Israeli's method of observation in drug formulation) 1.1.1 Classical method of observation in drug formulation • **M1.U2** ادویہ کی تحقیق وتشخیص میں رازی کا مشاہداتی طریقہ (Razi's Observational techniques in drug evaluation) 1.2.1 Classical techniques in drug evaluation • **M1.U3** یونانی ادویہ کی معیار بندی (Standardization of Unani Drugs) 1.3.1 General Description of Standardization	2	10	20	30	60

	• **M1.U4** مختلف کیمیاوی اجزاء نباتیہ کی یفی تشخیص کے کیمیاوی طریقے (Qualitative chemical test for different Phyto-constituents) 1.4.1 Qualitative tests of Standardization • **M1.U5** مختلف کیمیاوی اجزاء نباتیہ کی کمیت کی تعیین کے کیمیاوی طریقے (Quantitative Chemical Tests for different Phyto-Constituents) 1.5.1 Quantitative tests of Standardization • **M1.U6** معیار بندی کے طبعی و کیمیاوی طریقے (Physiochemical Methods of Standardization) 1.6.1 Methods of Standardization					
2	**M-2 ادویہ کی معیار بندی میں تجزیاتی تکنیک اور آلہ جاتی طریقوں کا استعمال (Analytical Techniques and Instrumental Methods Used in Drug Standardization)** This module involves mostly the experiential learning part of the curriculum. At the end of this module, the student will be able to interpret & evaluate different analytical techniques and instrumental methods used in drug standardization. The scholar will be guided to have first-hand experience with the various high-end instruments and types of equipment used in drug standardization. The students will be well acquainted with the methods applied during the separation of various molecules present in the single and compound Unani formulations. The chromatographic, spectroscopic, electrophoretic, and related techniques will be demonstrated during this entire module. • **M2.U1** ادویہ کی معیار بندی میں تجزیاتی تکنیک اور آلہ جاتی طریقوں کے استعمال کے اغراض و مقاصد اور اقسام (Types, aims and objectives of Analytical Techniques and Instrumental Methods Used in Drug Standardization) 2.1.1 Analytical Techniques and Instrumental Methods Used in Drug Standardization • **M2.U2** ادویہ کی معیار بندی میں لون نگاری کی تکنیک (Chromatographic techniques in drug standardization) 2.2.1 Chromatographic techniques	2	10	20	30	60

	• **M2.U3** اسپکٹروسکوپی اور اسکی قسمیں (Spectroscopy & its types) 2.3.1 General description of Spectroscopy • **M2.U4** برقیہ حرکت کے طریقے، ذراتی حجم کا تجزیہ، ایکس رے تعطل تجزیہ (Method of Electrophoresis, Particlesize analysis and X-ray Diffraction(XRD) Analysis) 2.4.1 General description of electrophoresis and other relevant analysis					
3	**M-3 (ادویہ مفردہ اور ادویہ مرکبہ کی معیار بندی (عرق، معجون، سفوف، قرص، حب، روغن، مراہم، ضماد) Standardization of Single and Compound Formulations (Arq, Majoon, Safoof, Sharbat, Qurs, Habb, Roghan, Marham & Zimad)** The entire module will be about the process and product standardization of single and compound Unani formulations. During this module, the teacher/guide will accompany students to pharmaceutical industry/institute/drug testing labs for hands-on training on instruments used for stability studies of Unani formulations. At the end of this module, the postgraduate student of Ilmul Advia will be explained about the methods and procedures employed for estimation of aflatoxin contamination, microbial contamination, pesticide residue, and heavy metals by video tutorials or simulation methods. The students will be well-versed in the knowledge about the use of various adulterants used to alter the quality of Unani drugs. This module also involves a field visit to provide students with on-site experience about the methods employed for the good storage conditions and transport of crude drugs. Lastly, the students will understand the process of acquiring NABL accreditation and related issues. • **M3.U1** عملیات اور مصنوعات کی معیار بندی (Process and Product Standardization) 3.1.1 General description of Process and Product Standardization • **M3.U2** مطالعاتِ استحکام اور ادویہ کی مدت حیات (Stability studies and Shelf life) 3.2.1 Stability studies and Shelf life in Unani Medicine • **M3.U3** ادویاتی اوصاف پر اثرانداز ہونے والے عوامل (Factors affecting the quality of drugs) 3.3.1 Adulteration in Unani Medicine	2	10	20	30	60

	• **M3.U4** ادویاتی صنعت کے رہنما دستور، معیاری طریقہ کار اور این اے بی ایل کی منظوری (GMP, SOPs and NABL accreditation) 3.4.1 Developing various SOPs					
4	**M-4 تجرباتی علم الادویہ کے مبادیات (Essentials of Experimental Pharmacology)** This module is designed to provide an integrated understanding of animal experimentation in the context of Unani medicine, covering both foundational knowledge and practical skills. Students will begin by exploring the scope, importance, and ethical dimensions of animal research, including an appraisal of the contributions of Unani medicine scholars. The module then builds upon this theoretical framework with details on preclinical research, phases of drug development, and dose calculation methods, including dose translation from humans to animals and the factors influencing drug responses. Learners will also gain exposure to laboratory animal characteristics, including the uses and strains of rats, mice, rabbits, and guinea pigs, and how these models apply to Unani research. The ethical use of animals is emphasized through lectures on animal ethics, CCSEA guidelines, and experiential learning focused on the Institutional Animal Ethics Committee (IAEC). Practical components include simulated demonstrations of various procedures carried out on laboratory animals. The experiential activities illustrate the factors affecting drug response, methods of anesthesia, and pharmacological procedures, further reinforcing the skills through hands-on and software-based training. • **M4.U1** ادویہ کے نمو و ارتقاء کے روایتی طریقے (Classical Method of Drug Development) 4.1.1 Scope of animal research in Unani medicine 4.1.2 Galen's Experiments for developing Tiryaq (Antidotes) 4.1.3 Experimentation in the light of Muqaddima Kitab al Mia 4.1.4 Ibn Sina Protocol for Experimentation	2	10	20	30	60

	4.1.5 Ibn Rushd's Drug Development Methodology • **M4.U2** ادویہ کی تلاش اور اس کے ارتقاء میں ماقبل سریر یاتی تحقیقات کا جائزہ (Overview of preclinical research in drug discovery and development) 4.2.1 Define preclinical research 4.2.2 Types of preclinical research 4.2.3 Significance of Preclinical Research, Drug discovery and development process • **M4.U3** تجرباتی علم الادویہ میں مستعمل تجربہ گاہی حیوانات (Laboratory Animals in Experimental Pharmacology) 4.3.1 Common laboratory animals, characteristics, handling, and experimental uses of different species and strains 4.3.2 Factors affecting drug responses in laboratory animals 4.3.3 Dose translation from humans to animals/animals to humans 4.3.4 Limitations of animal experimentation • **M4.U4** عمومی تجربہ گاہی تکنیکیں (Common Laboratory Techniques) 4.4.1 Routes of drug administration and vehicles used for drug administration through various routes 4.4.2 Techniques of withdrawal of blood samples from animals 4.4.3 Methods of anaesthesia and euthanasia for laboratory animals and anaesthetic agents used for laboratory animals					

	• **M4.U5** تجربہ گاہی جانداروں کے رکھ رکھاؤ، تجربہ سے متعلق حیوانی اخلاقیات اوسی سی ایس ای اے کے رہنما اصول وضوابط (Laboratory animal ethics and CCSEA guidelines for laboratory animal handling and experimentation) 4.5.1 Importance of laboratory animal ethics in experimental research 4.5.2 Committee for Control and Supervision of Experiments on Animals (CCSEA) guidelines for laboratory animal handling and experimentation					
5	**M-5 ادویاتی چھان بین، حیاتیاتی جانچ اور دیگر طریقہ کار (Pharmacological Screening, Bioassay and Alternative Models)** This module offers an in-depth understanding of experimental pharmacology with a specific focus on bioassay techniques, neuropharmacological screening, and the application of alternative research models. Students will gain practical exposure to a range of in vitro and simulated models used in pharmacological screening, including the organ bath system, dose-response curve generation, and preparation of physiological salt solutions. Through experiential learning, simulations, and hands-on lab sessions, this module aims to develop both conceptual clarity and technical proficiency in modern pharmacological and ethical research practices. • **M5.U1** ادویاتی چھان بین (Drug Screening) 5.1.1 General Consideration in Drug Screening 5.1.2 Simple, Programmed, and Blind Screening 5.1.3 High-throughput screening • **M5.U2** ادویہ عصبانیہ کی چھان بین (Neuropharmacological Screening)	2	10	20	30	60

	5.2.1 Neuropharmacological Studies 5.2.2 Functional Observational Battery 5.2.3 Irwin's Profile • **M5.U3** حیاتیاتی جانچ(Bioassay) 5.3.1 Scope, Principles, Types of Bioassay 5.3.2 Designing of Bioassay • **M5.U4** علیحدہ اور الگ کئے گئے انسجہ پر تجربات(Isolated Tissue Experiments) 5.4.1 Setup of isolated tissue preparation 5.4.2 Methods of Recording Tissue Response 5.4.3 Limitations of isolated tissue experiments • **M5.U5** Concept of 3R's and alternatives to animal experiments 5.5.1 In-silico methods 5.5.2 Cell-based assay 5.5.3 C. elegans as a model 5.5.4 Zebrafish embryo as a model 5.5.5 Non-animal approaches for testing Skin irritation and Skin Sensitization					
6	**M-6 علم السموم۔متعلقہ ضابطہ و قوانین اور ان کے مبادیات (Fundamentals of Regulatory Toxicology)** This module provides an in-depth understanding of local toxicity, skin sensitization, reproductive and developmental toxicity, and carcinogenicity testing relevant to Unani drugs. Learners will appraise regulatory guidelines such as OECD and NDCT Rule 2019	2	10	20	30	60

	and apply Good Laboratory Practices (GLP) in designing toxicity studies. Through practical and experiential learning, students will explore evaluation methods for acute dermal irritation, skin sensitization, and systemic toxicity. They will also communicate findings from local toxicity assessments using structured formats. Emphasis is placed on protocol development for Unani formulations, especially in reproductive and developmental toxicity contexts. The course encourages critical analysis of genotoxicity and carcinogenicity studies from a scientific perspective. Learners will explore relevant ethical and regulatory considerations for non-clinical testing. Both lectures and hands-on sessions support skill development in interpreting toxicity endpoints. The module fosters scientific reasoning through literature review, discussion, and practical demonstration. By the end, students will be equipped to design, evaluate, and interpret regulatory toxicity studies in alignment with current guidelines. • **M6.U1** علم السموم۔متعلقہ ضابطہ و قوانین (Regulatory Toxicology) 6.1.1 Definition of Regulatory Toxicology 6.1.2 Significance of Regulatory Toxicity Studies 6.1.3 Classification of Regulatory Toxicity Studies • **M6.U2** سمیات سے متعلق قوانین وضوابط (Regulatory Toxicity Guidelines) 6.2.1 Brief overview of OECD and ICH guidelines for toxicity testing 6.2.2 NDCT Rule-2019 6.2.3 OECD-Good Laboratory Practices • **M6.U3** نظامی مطالعات سمیت (Systemic toxicity studies) 6.3.1 Acute toxicity studies 6.3.2 Repeated Dose (28-days, 90-days, 180-days) toxicity studies • **M6.U4** جینیاتی و سرطان زائی سمیت (Genotoxicity and Carcinogenicity)					

	6.4.1 Requirement and significance of genotoxicity testing 6.4.2 Various types of genotoxicity assays 6.4.3 Carcinogenicity studies • **M6.U5** سمیت دوران تولید وار تقاء جنین (Reproductive and Developmental Toxicity) 6.5.1 Requirement and Significance of Reproductive and Developmental Toxicity testing 6.5.2 Various types of Reproductive and Developmental Toxicity Tests • **M6.U6** جلد کی حساسیت اور مقامی سمیت (Local Toxicity and Skin Sensitization) 6.6.1 Dermal Irritation 6.6.2 Eye Irritation 6.6.3 Skin Sensitization					
7	**M-7 ذی حیات میں ادویاتی افعال و خواص کے چھان بین کے طریقے (In-vivo Methods of Drug Screening)** This module is designed to impart knowledge on the various *in vivo* screening methods. Module contents enable students to understand various types of animal models used in the screening of drugs. Students will be able to understand the purpose and rationale behind the use of each model. They will also learn about the screening procedure and evaluation parameters for the assessment of the efficacy of the test compound. The students will be able to operate certain pharmacological instruments and understand the screening procedures through simulated software. • **M7.U1** حیوانات میں مواد ادویہ کے دافع الم، دافع حمیٰ اور محلل فعل پر جانچ پڑتال (Animal Models for Evaluating Analgesic, Antipyretic, Anti-inflammatory Activity) 7.1.1 Analgesic Activity	2	10	20	30	60

	7.1.1.1 Eddy's hot plate method, 7.1.1.2 Tail flick method 7.1.1.3 Tail immersion method 7.1.1.4 Tail clip test 7.1.1.5 Writhing test 7.1.2 Antipyretic Activity 7.1.2.1 Yeast-induced pyrexia 7.1.2.2 Lipopolysaccharide-induced pyrexia 7.1.3 Anti-inflammatory activity 7.1.3.1 Carrageenan-induced rat paw edema test 7.1.3.2 Cotton pellet implantation test 7.1.3.3 Freund's adjuvant-induced arthritis test • **M7.U2** حیوانات میں مواد ادویہ کے دافع قرحہ فعل پر جانچ پڑتال (Animal Models for Evaluation of Anti-ulcer Activity) 7.2.1 Induction of gastric ulcer by ulcerogenic agent 7.2.2 Stress-induced gastric ulcer • **M7.U3** حیوانات میں مواد ادویہ کے قلب و دوران خون پر اثر پذیری کی جانچ پڑتال (Animal Models for Evaluation of the Effect of Drugs on the Cardiovascular System)					

	7.3.1 Isoproterenol-induced myocardial infarction 7.3.2 DOCA-salt-induced Hypertension • **M7.U4** حیوانات میں مواد ادویہ کے محافظ کبد فعل کی جانچ پڑتال (Hepatoprotective Activity) 7.4.1 Animal Models for Evaluation of Hepatoprotective Activity by Various Hepatotoxicants • **M7.U5** حیوانات میں مواد ادویہ کے محافظ کلیہ فعل کی جانچ پڑتال (Animal Models for Evaluation of Nephroprotective Activity) 7.5.1 Cisplatin-induced nephrotoxicity, 7.5.2 Adriamycin-induced nephrotoxicity • **M7.U6** حیوانات میں مواد ادویہ کے دافع ذیابیطس فعل کی جانچ پڑتال (Animal Models for Evaluation of Hypoglycaemic Activity) 7.6.1 Streptozotocin and alloxan-induced diabetes 7.6.2 High fat diet and low dose induced streptozotocin-induced model • **M7.U7** حیوانات میں مواد ادویہ کے قاطع شحم الدم فعل کی جانچ پڑتال (Animal Models for Evaluation of Hypolipidemic Activity) 7.7.1 High-fat diet-induced hyperlipidemia 7.7.2 Fructose induced dyslipidemia • **M7.U8** حیوانات میں مواد ادویہ کے دافع اضطراب، دافع وحشت، دافع تشنج، مخدر اور منوم فعل کی جانچ پڑتال (Animal Models for Evaluation of Anti-anxiety, Anti-depressant, Anticonvulsant, Sedative and Hypnotic Activity) 7.8.1 Elevated plus maze test					

	7.8.2 Light-dark exploration test 7.8.3 Despair swim test 7.8.4 Tail suspension test 7.8.5 Maximal Electro Shock induced convulsion test 7.8.6 Pentylenetetrazolinduced convulsion test 7.8.7 Righting reflex test 7.8.8 Pentobarbitone narcosis potentiation test 7.8.9 Spontaneous motor activity • **M7.U9** حیوانات میں مواد ادویہ کے قوی نفسانیہ پر اثر پذیری کی جانچ پڑتال (Animal Models for Evaluation of Effect of Drug on Cognitive Function) 7.9.1 Passive Avoidance Test 7.9.2 Morris Water Maze Test					
8	**M-8 تحقیقاتی رپورٹ اور سائنسی و علمی تحریر (Scientific Writing and Research Reporting)** In this module, students will progressively develop their understanding and application of ethical and methodological principles in pharmacological research. Beginning with foundational knowledge, students will discuss the basics of experimental design and the importance of publication ethics. They will describe and illustrate the components of ARRIVE and PREPARE guidelines, which govern the ethical planning and reporting of in vivo experiments. Using these frameworks, learners will then frame experimental protocols to evaluate Unani drugs, select suitable animal models, and calculate appropriate sample sizes. Through practical and experiential exercises, students will allocate animals into groups and design software-based simulations to assess drug efficacy. As the module advances, they will analyze research data through the lens of ARRIVE and apply COPE guidelines to assess ethical conduct in scientific writing. Finally, students will utilize plagiarism detection tools and prepare a complete manuscript	2	10	20	30	60

	following ICMJE Recommendations, thus integrating ethical integrity with scientific rigor in their research outputs. • **M8.U1** حیوانات پر ریسرچ وتحقیق کے تجرباتی مناہج (Experimental Design for Animal Research) 8.1.1 Definition of Experimental design 8.1.2 Importance of Experimental design 8.1.3 Types of Experimental design 8.1.4 Experimental Unit 8.1.5 Randomization: Importance and types 8.1.6 Control and its types 8.1.7 Sample size • **M8.U2** پری پیئر کے رھنماءاصول (PREPARE Guidelines) 8.2.1 Introduction to PREPARE guidelines 8.2.2 Components 8.2.3 Formulation of the study 8.2.4 Dialogue between Scientist and animal facility 8.2.5 Quality control of the component in the study • **M8.U3** ارائیو کے رھنماءاصول (ARRIVE Guidelines) 8.3.1 Introduction to ARRIVE guidelines 8.3.2 Components of ARRIVE guidelines					

	8.3.3 Reporting of *in vivo* experiments • **M8.U4** سرقہ،اشاعتی اخلاقیات،کوپ کے رھنمااصول (Plagiarism, Publication Ethics, COPE Guidelines, and ICMJE Recommendations) 8.4.1 Plagiarism 8.4.1.1 Define Plagiarism 8.4.1.2 Discuss measures to avoid Plagiarism in scientific writing 8.4.1.3 Name the Plagiarism checker software 8.4.1.4 Check a manuscript by using plagiarism checker software. 8.4.2 Publication Ethics and ICMJE Recommendations 8.4.2.1 Define Publication Ethics and explain its importance 8.4.2. 2 Discuss COPE Guidelines 8.4.2.3 Enumerate the components of COPE 8.4.2.4 Explain the ICMJE Recommendations					
		16	80	160	240	480

Table 3 : Modules - Unit - Module Learning Objectives and Session Learning Objective- Notional Learning Hours- Domain-Level- TL Methods

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 1 : ادویائی مشاہدات کے روایتی طریقے اور یونانی ادویہ کی معیار بندی (Classical methods of drug observation and Standardization of Unani Drugs)						
Module Learning Objectives (At the end of the module, the students should be able to) 1. Appraise Attar Israeli's method of observation in drug formulation 2. Explore the methods of standardisation of Unani drugs 3. Conduct qualitative and quantitative tests for the standardization of Unani drugs 4. Evaluate Razi's observational techniques in drug evaluation						
Unit 1 ادویہ کی ترکیب وصناعت میں حکیم عطار اسرائیلی کا مشاہداتی طریقہ (Attar Israeli's method of observation in drug formulation) 1.1.1 Classical method of observation in drug formulation **References:** 42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5	Describe Tarkeeb-i-Advia as mentioned by Attar Israeli	1	Lecture	CC	Knows-how	L
CO 1,CO 3,CO 5	Appraise various methods adopted by Attar Israeli in drug formulation	2	Experiential-	PSY-GUD	Shows-how	SDL

			Learning1.1			
Unit 2 ادویہ کی تحقیق وتشخیص میں رازی کا مشاہداتی طریقہ (Razi's Observational techniques in drug evaluation)						
1.2.1 Classical techniques in drug evaluation **References:** 41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57						
3A	**3B**	**3C**	**3D**	**3E**	**3F**	**3G**
CO 1,CO 3,CO 5	Describe Razi's Observational techniques in drug evaluation	1	Lecture	CC	Knows-how	L
CO 1,CO 3,CO 5	Illustrate Razi's methods employed in identifying drugs according to various disease	2	Experiential-Learning1.2	PSY-GUD	Shows-how	SDL
Unit 3 یونانی ادویہ کی معیاربندی (Standardization of Unani Drugs)						
1.3.1 General Description of Standardization **References:** 41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57						
3A	**3B**	**3C**	**3D**	**3E**	**3F**	**3G**
CO 1,CO 3,CO 5	Appraise the standardization procedures of drugs of Unani medicine.	1	Lecture	CC	Knows-how	L
CO 1,CO 3,CO 5	Describe Aims and Objectives of Standardization of Unani Drugs of Herbal, Mineral, and Animal Origin	1	Lecture	CC	Knows-how	L,L&PPT
CO 1,CO 3,CO 5	Perform standardization of Herbal drug	2	Practical1.1	PSY-GUD	Shows-how	PT
CO 1,CO 3,CO 5	Perform standardization of Mineral and Animal-origin drugs	2	Practical1.2	PSY-GUD	Shows-how	PT
CO 1,CO 3,CO 5	Observe guided procedures of high-end instruments for standardization of Unani Drugs	8	Experiential-	CAP	Shows-how	FV

			Learning1.3			

Unit 4 مختلف کیمیاوی اجزاء نباتیہ کی یقی تشخیص کے کیمیاوی طریقے (Qualitative chemical test for different Phyto-constituents)

1.4.1 Qualitative tests of Standardization

References: 41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5	Describe different qualitative phytochemical test to identify the secondary metabolites	3	Lecture	CC	Knows-how	L
CO 1,CO 3,CO 5	Identify Phyto-constituents like 1. Alkaloids 2. Glycosides 3. Flavonoids 4. Saponins 5. Phenols 6. Resins 7. Carbohydrates 8. Amino acids 9. Fats 10. Fixed oils 11. Volatile oil 12. Tannin 13. Sterols	4	Practical1.3	PSY-GUD	Shows-how	PT
CO 1,CO 3,CO 5	Appraise for tests and procedures to identify secondary metabolites	7	Experiential-Learning1.4	CAN	Does	KL,LS,PT,SDL

Unit 5 مختلف کیمیاوی اجزاء نباتیہ کی کمیت کی تعیین کے کیمیاوی طریقے (Quantitative Chemical Tests for different Phyto-Constituents)

1.5.1 Quantitative tests of Standardization

References: 1,58,59,60						
3A	**3B**	**3C**	**3D**	**3E**	**3F**	**3G**
CO 1,CO 3,CO 5	Describe different quantitative phytochemical test to identify the secondary metabolites	2	Lecture	CC	Knows-how	L,L&PPT
CO 1,CO 3,CO 5	Demonstrate the quantitative values of different Phyto-constituents like 1. Alkaloids 2. Glycosides 3. Flavonoids 4. Saponins 5. Phenols 6. Resins 7. Carbohydrates 8. Amino acids 9. Fats 10. Fixed oils 11. Volatile oil 12. Tannin 13. Sterols	4	Practical1.4	PSY-GUD	Shows-how	PT
CO 1,CO 3,CO 5	Assess the quantity of secondary metabolites	7	Experiential-Learning1.5	CAP	Does	KL,LS,SDL

Unit 6 معیاربندی کے طبعی وکیمیاوی طریقے (Physiochemical Methods of Standardization)

1.6.1 Methods of Standardization

References: 1,3,8,58,59,60

3A	**3B**	**3C**	**3D**	**3E**	**3F**	**3G**
CO 1,CO 3,CO 5	Describe different Physicochemical tests for standardization.	1	Lecture	CC	Knows-how	L,L&PPT

CO 1,CO 3,CO 5	Demonstrate the physicochemical values of the following parameters 1. Foreign matter 2. Ash values 3. Extractive values 4. pH value 5. Fluorescence analysis 6. Moisture content 7. Viscosity 8. Melting point 9. Solubility 10. Optical rotation 11. Refractive index 12. Specific gravity 13. Acid value 14. Ester value 15. Peroxide value 16. Iodine value 17. Hydroxyl value 18. Saponification value 19. Swelling Index 20. Foaming Index	8	Practical1.5	PSY-GUD	Shows-how	PT

Practical Training Activity

Practical 1.1 : Preliminary Phytochemical analysis of herbal drugs

Total Hours: 2

The students will perform basic Phytochemical tests for herbal drugs under the supervision of teacher

Practical 1.2 : Preliminary Phytochemical analysis

Total Hours: 2

The teacher will demonstrate various tests for the identification of mineral and animal-origin drugs. The students will repeat the basic Phytochemical tests for mineral and animal-origin drugs under the supervision of the teacher. They will submit the observations as practical records.

Practical 1.3 : Qualitative analysis of secondary metabolites

Total hours 4

The teacher will demonstrate the presence of various phytoconstituents, Including Alkaloids, Glycosides, and tannins. The students will perform qualitative analysis to identify different phytoconstituents present in the selected samples of crude drugs under the supervision of the teacher. The students will submit the activity in the form of a practical record.

The activity can be broken as follows:

Demonstration and Initial Practice 2 Hours

- The teacher will deliberate an overview of phytoconstituents: Alkaloids, Glycosides, and Tannins concerning their Importance and applications in pharmacognosy. He will give a brief introduction to the crude drugs being analyzed.
- The Teacher will Step-by-step demonstrate qualitative tests like Alkaloids (e.g., Mayer's test, Dragendorff's test), Glycosides (e.g., Borntrager's test), and Tannins (e.g., Ferric chloride test). He will show color changes/reactions and explain interpretation. Clarify doubts about procedures, and results, discuss lab safety and correct handling of reagents.

Student Analysis and Interpretation 2 Hours

Assign crude drug samples to student groups. Ensure availability of required reagents and equipment. Students perform the tests under supervision. Observe and record results for each phytoconstituent.

Groups share their findings. The teacher provides feedback and discusses any discrepancies or unexpected results.

Practical 1.4 : Quantitative analysis of secondary metabolites

Total duration: 4 hrs

The teacher will demonstrate quantitative estimation of various secondary metabolites present in drug samples. The students will repeat quantitative estimation of Alkaloids, Glycosides, Volatile oils, etc., present in the drugs under the supervision of the teacher. They will note the observations and present them as practical records.

The effective way to divide the 4-hour activity is as follows:

Teacher Demonstration & Guided Observation (2 hours)

- The teacher will demonstrate the step-by-step procedure for the quantitative estimation of different secondary metabolites such as Alkaloids, Glycosides, Volatile oils, and and others, depending on the drug samples available.

- Students will observe closely, and take detailed notes on the Reagents used, Instruments and setup, Key steps in the procedure, and Calculations (if applicable). The students to ask questions and clarify concepts during or after the demonstration.

Student Practice & Record Preparation (2 hours)

- Under teacher supervision, students will repeat the estimation procedures for the assigned secondary metabolites using the provided drug samples.
- Each student or group will Perform one or more estimations and note observations, measurements, and results accurately. Students will prepare their practical record, including the title and aim of the experiment, principles, materials and methods, observations and calculations, results, and conclusion.
- The record will be reviewed by the teacher for completeness and accuracy.

Practical 1.5 : Physicochemical analysis of secondary metabolites

Total duration: 8 hrs

The teacher will demonstrate the quality parameters of foreign matter, Ash value & other physiochemical parameters (Extractive values, pH value, Fluorescence analysis, Moisture content, Viscosity, Melting point, Solubility, Optical rotation, Refractive index, Specific gravity, Acid value, Ester value, Peroxide value, Iodine value, Hydroxyl value, Saponification value, Swelling Index, Foaming Index) for selected crude drug samples. Students will note the observations and submit the practical record to the teacher.

Here's a suggested breakdown of the activity:

Introduction & Demonstration of Basic Quality Parameters 2 Hours

The teacher will briefly introduce the practical with an emphasis on the Importance of quality control in crude drugs, an overview of all physiochemical parameters, and an Introduction to selected crude drug samples.

The teacher will demonstrate Foreign matter analysis, Ash value (Total, Acid-insoluble, Water-soluble), Moisture content (Loss on drying), Students will observe and take notes.

Extractive Values & Basic Physicochemical Tests 2 Hours

The teacher will show a Demonstration for Extractive values (Water-soluble & Alcohol-soluble), pH value, Solubility (in water, alcohol, etc.), and Fluorescence Analysis of dry powder and extracts under UV light. The students will observe and discuss the doubts or queries and the teacher will provide Guidance on how to record observations properly.

Demonstration of Analytical Parameters 2 Hours

The teacher will show a demonstration of Melting point, Viscosity, Optical rotation, Refractive index, and Specific gravity. The students will note data and discuss the application of each parameter.

Oil & Plant Extract Evaluation 2 Hours

The teacher will demonstrate Acid value, Ester value, Peroxide value, Iodine value, Hydroxyl value, Saponification value for oil-bearing plant samples Swelling Index for mucilage-containing drugs, and Foaming Index for tannins. The students will Clarify their doubts after recording observations. They will Compile and submit the observations as practical record books.

Experiential learning Activity

Experiential-Learning 1.1 : Drug formulation standardisation described by Attar Israeli.

Total duration: 2 hrs

The student will be instructed to survey the book authored by Attar Israeli, note the observations about the methods of formulating a drug, and submit the assignment mentioning the methods noted about drug formulation. The teacher will discuss the assignment, summarise it, and conclude it.

Experiential-Learning 1.2 : Razi's methods for identifying drugs according to various diseases

Total duration: 2

The student will be asked to read the book authored by Razi and prepare and submit the assignment mentioning the observational techniques learned.

Experiential-Learning 1.3 : High end instruments used in standerdization

Total duration: 8

The teacher will accompany students to the pharmaceutical industry/institute/ Drug Testing labs for hands-on training/Instrumental demonstration. The students will be exposed to real-world experience with working instruments. They will be instructed to fill in their observations aa a checklist prepared before the visit and submit the visit observations as an assignment to the teacher.

The structured breakdown of this activity, an educational visit to a pharmaceutical industry/institute/drug testing lab is as follows:

Pre-Visit Orientation & Checklist Preparation (1.5 hours)

- The teacher briefs students about the purpose of the visit and key instruments and processes they may observe (e.g., HPLC, UV spectrophotometer, GC, dissolution testers, etc.), and safety protocols and professional behavior.
- Students are provided a pre-designed observation checklist or guided to prepare one themselves, including Instrument name, Purpose/use, Principle of operation, Key features/parts, and Observations during use.

- The students will be given an opportunity to clarify doubts about what to observe and record.

On-Site Exposure and Demonstration (3 hours)

- Students visit the selected industry, institute, or drug testing lab under teacher supervision. Industry/lab professionals demonstrate Instrument handling, Analytical procedures, Sample preparation, and Quality control/assurance steps.
- Students observe actively and fill in their observation checklists on-site.

Post-Visit Discussion & Clarification (1.5 hours)

- Students and teacher engage in a group discussion to share key takeaways from the visit, clarify doubts or unclear observations, and discuss the role of instruments in real-world pharmaceutical analysis

Assignment Compilation and Submission (2 hours)

- Students convert their checklist and observations into a formal visit report, including an introduction and objectives of the visit, instrument-wise summary of observations, Photos/diagrams (if allowed), and conclusion/reflection on the experience
- Submit the completed report as an assignment to the teacher.

Experiential-Learning 1.4 : Identification of secondary metabolites

Total duration: 7 hrs

The students will be asked to search and watch video clips to have first-hand experience about the identification of secondary metabolites like Alkaloids, Glycosides, Flavonoids, Saponins, Phenols, Resins, Carbohydrates, Amino acids, Fats, Fixed oils, Volatile oil, Tannin and Sterols present in the crude drugs and submit assignment on the same

The structured breakdown of the activity focused on helping students gain a first-hand virtual experience of identifying various secondary metabolites in crude drugs is as follows:

Video Search and Exploration (2.5 hours)

- Students are provided a list of secondary metabolites to focus on, such as:
  Alkaloids, Glycosides, Flavonoids, Saponins, Phenols, Resins, Carbohydrates, Amino acids, Fats, Fixed oils, Volatile oils, Tannins, Sterols
- They are instructed to search and watch video clips (YouTube, educational sites, etc.) demonstrating identification tests for each metabolite.

- While watching, students note the test name/method used (e.g., Dragendorff's test for alkaloids, Reagents and indicators involved, Color changes or precipitate formation as test results, and any precautions or tips mentioned

Observation Notes and Content Organization (2 hours)

- Students create structured notes for each metabolite like Name of the metabolite, Identification test(s) used, principle behind the test, Procedure summary, and Observation/result
- Notes may include video screenshots, illustrations, or flow diagrams if applicable.

Assignment Compilation and Submission (2.5 hours)

- Students prepare a final assignment/report including an introduction (on the importance of identifying secondary metabolites), Organized sections for each metabolite with observation details, and a conclusion summarizing their learning experience, and a list of video sources/references
- Ensure clarity, completeness, and neat presentation (typed or handwritten, as instructed).

Experiential-Learning 1.5 : Quantitative estimation of secondary metabolites

Total duration: 7 hrs

Students will be instructed to search and observe video clips on the web to observe how to perform the experiments for quantitative estimation of secondary metabolites in crude drugs. Each student will be assigned one secondary metabolite to observe. The student will submit the observations as an assignment on the same.

The activity may be divided as follows:

Survey and Observation (2.5 hours)

- Each student is assigned one secondary metabolite (e.g., alkaloids, flavonoids, saponins, tannins, etc.). Students search online (YouTube, educational platforms, etc.) for video demonstrations of the estimation process for their assigned metabolite.
- They watch and take notes on Materials and reagents used, Procedure steps, Observation techniques, and Interpretation of results

Analysis and Note Preparation (2 hours)

- Students organize their findings into the title of the experiment, principle involved, Step-by-step procedure as seen in the videos, Key observations, and Precautions or critical steps

Assignment Compilation and Submission (2.5 hours)

- Students draft their final assignment (word-processed or handwritten with clear formatting)..Ensure the inclusion of an introduction (brief description of the metabolite and its importance), Observation Summary, and References/Links to Videos. Finally check for grammar, completeness, and clarity.

Modular Assessment

Assessment method	**Hour**
Instructions: Conduct a structured modular assessment. Assessment will be for 50 for this module. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the modular grade point as per Table 6C. 1. Practical-30 For example, practical "estimation of physicochemical analysis" can be done with the following criteria: **Observation Skills: 10** marks • Accuracy and attention to detail while noting the teacher's demonstrations. Includes noting color changes, physical properties, reactions, etc. **Completeness of Practical Record: 10** marks • All parameters are covered as demonstrated (foreign matter, ash value, extractive value, etc.). No missing entries. **Accuracy of Recorded Data: 10** marks • Observations correctly matched with expected outcomes based on the teacher's demonstration. No major errors or misinterpretations. **Understanding of Parameters (Viva or Notes): 10** marks Brief explanation/definition of any 4-5 tested parameters OR oral questioning by the teacher during/after the session. **Neatness & Organization of Practical Record. 5** marks • Legibility, clarity, and systematic recording. Tables, headings, units, and spacing are maintained.	4

Timely Submission 5 marks • The practical record was submitted on or before the deadline. Deduct marks for late submission. 1. SAQ-20 marks Or Any practical in converted form can be taken for assessment. (25 marks) & Any of the experiential learning activities, such as portfolios, reflections, or presentations, can be taken as an assessment. (25 marks)	

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 2 : ادویہ کی معیار بندی میں تجزیاتی تکنیک اور آلہ جاتی طریقوں کا استعمال (Analytical Techniques and Instrumental Methods Used in Drug Standardization)						
Module Learning Objectives **(At the end of the module, the students should be able to)** 1. Demonstrate Analytical Techniques Used in Drug Standardization 2. Interpret Instrumental Methods Used in Drug Standardization 3. Evaluate different Analytical Techniques and Instrumental Methods Used in Drug Standardization 4. Discuss about Analytical Techniques and Instrumental Methods Used in Drug Standardization						
Unit 1 ادویہ کی معیار بندی میں تجزیاتی تکنیک اور آلہ جاتی طریقوں کے استعمال کے اغراض و مقاصد اور اقسام (Types, aims and objectives of Analytical Techniques and Instrumental Methods Used in Drug Standardization) 2.1.1 Analytical Techniques and Instrumental Methods Used in Drug Standardization **References:** 1,3,5,6,7,8						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5	Describe aims, objectives, and types, of Analytical Techniques used in drug standardization.	1	Lecture	CC	Knows-how	L
CO 1,CO 3,CO 5	Discuss various Instrumental Methods Used in Drug Standardization	2	Lecture	CC	Knows-how	L
Unit 2 ادویہ کی معیار بندی میں لون نگاری کی تکنیک (Chromatographic techniques in drug standardization) 2.2.1 Chromatographic techniques **References:** 1,3,5,7,9						

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5	Discuss chromatography like Paper Chromatography, Column Chromatography, Liquid Chromatography, Gas Chromatography, Supercritical Fluid Chromatography	2	Lecture	CC	Knows-how	L&PPT
CO 1,CO 3,CO 5	Describe Thin layer chromatography, HPTLC and HPLC	1	Lecture	CC	Knows-how	L&PPT
CO 1,CO 3,CO 5	Perform following chromatographic techniques 1. Thin layer chromatography 2. Paper Chromatography,	10	Practical2.1	PSY-GUD	Shows-how	L_VC,PT
CO 1,CO 3,CO 5	Demonstrate the following: 1. Column Chromatography 2. Gas Chromatography	10	Practical2.2	PSY-GUD	Shows-how	L&PPT ,L_VC,LS,PT
CO 1,CO 3,CO 5	Elucidate the principles and procedures of following chromatographic techniques 1. Liquid Chromatography 2. HPTLC and HPLC 3. UPLC	10	Experiential-Learning2.1	PSY-GUD	Does	IBL,LS,Mnt,PAL,PER,SDL

Unit 3 اسپیکٹروسکوپی اور اسکی قسمیں (Spectroscopy & its types)

2.3.1 General description of Spectroscopy

References: 1,3,5,6,7,8,9,10

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5	Describe the general principles and procedure of Spectroscopy	1	Lecture	CK	Knows-how	L&PPT

CO 1,CO 3,CO 5	Describe the application of Spectroscopy in drug standardization	1	Lecture	CK	Knows-how	L&PPT
CO 1,CO 3,CO 5	Differentiate working principles of the following techniques: 1. UV Spectroscopy, 2. Mass Spectroscopy, 3. LC-MS, 4. GC-MS, 5. FTIR, 6. Atomic Absorption spectroscopy 7. ICP-OES	8	Experiential-Learning2.2	PSY-GUD	Knows-how	DIS,LS,PER,SDL

Unit 4 برقیہ حرکت کے طریقے، ذرائی حجم کا تجزیہ، ایس رے تعطل تجزیہ (Method of Electrophoresis, Particlesize analysis and X-ray Diffraction(XRD) Analysis)

2.4.1 General description of electrophoresis and other relevant analysis

References: 1,3,5,6,7,8,9

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5	Describe the principles and procedure of electrophoresis	1	Lecture	CK	Knows-how	L&PPT
CO 1,CO 3,CO 5	Describe the application of electrophoresis in drug standardization	1	Lecture	CK	Knows-how	L&PPT
CO 1,CO 3,CO 5	Appraise the Particle size analysis, by the following methods: 1. X-ray Diffraction (XRD) Analysis 2. Energy-dispersive X-ray spectroscopy (EDS, EDX, or XEDS) 3. Transmission Electron Microscopy (TEM) 4. Scanning Electron Microscopy (SEM) 5. Thermo gravimetric analysis (TGA), 6. Atomic force microscopy (AFM) 7. X-Ray Fluorescence Spectrometry (XRF) 8. X-Ray Fluorescence Spectrometry (XRF)	8	Experiential-Learning2.3	PSY-GUD	Does	DIS,LS,PER,SDL

Practical Training Activity

Practical 2.1 : Chromatographic Techniques of TLC and Paper chromatography

Total duration: 10 hrs

The students will be demonstrated Paper chromatography and Thin layer Chromatography and students will present the same as practical records.

Practical 2.2 : Chromatographic Techniques of Column Chromatography, Gas Chromatography & Supercritical Fluid Chromatography

Total duration:10 hrs

1. The teacher will demonstrate and explain to the student Column Chromatography, Gas Chromatography & Supercritical Fluid Chromatography through videos or in the laboratory. 1 hr

2. Each student will instructed to view the video and demonstrate before teacher and peer group about the techniques. 3hr

3. Each students will instructed to go to the library/digital library to collect the image and detiails of the techniques and submit it as an assignment. 3 hr

4. Each students will instructed to go to the library/digital library for review of research paper on five plants for for the application of Column Chromatography, Gas Chromatography & Supercritical Fluid Chromatography and the students will present them in the form of practical records. 3 hr

Experiential learning Activity

Experiential-Learning 2.1 : High-end chromatographic techniques

Total duration: 8 hrs

Students will search for and watch video clips, research papers, or manuals demonstrating high-end chromatographic techniques like Liquid Chromatography, HPTLC, HPLC, and UPLC. Each student will write various steps of the procedure of one technique and match them to the working principle involved and submit assignments on the same. The teacher will conclude and summarise the observations in class.

The well-structured breakdown of the activity focused on high-end chromatographic techniques (Liquid Chromatography, HPTLC, HPLC, UPLC) is as follows:

Exploration & Resource Collection (2 hours)

- Each student is assigned or selects one chromatographic technique from Liquid Chromatography (LC), High-Performance Thin Layer Chromatography (HPTLC), High-Performance Liquid Chromatography (HPLC), or Ultra-Performance Liquid Chromatography (UPLC).

- Students search for and watch educational video clips, read research papers, or refer to manuals showing instrument setup, Sample preparation, Step-by-step procedure, and Real-world applications to gather a comprehensive understanding of the technique they chose.

Procedure Writing & Principle Matching (2 hours)

- Each student writes out the detailed step-by-step procedure for their assigned technique. They must match each major step with the underlying working principle (e.g., separation by polarity, use of pressure, stationary/mobile phase interactions) to generate a clear, written assignment connecting practice to theory.

Assignment Finalization & Submission (2 hours)

- Students refine their procedure write-ups into a formal assignment document Include diagrams or references from videos/manuals used and submit the assignment for evaluation.

Classroom Summary & Discussion (2 hours)

- The teacher reviews common patterns, challenges, and key learnings across all submissions. A classroom discussion will follow, allowing students to compare different techniques, ask questions, and understand broader applications or differences in sensitivity/resolution.

Experiential-Learning 2.2 : Working principles of various Spectroscopic Techniques

Total duration: 10 hrs

Each Student will be instructed to visit the library and surf the internet to collect material on the working principles of one of the various spectroscopic techniques, prepare a PowerPoint presentation, and present it before the class on UV Spectroscopy, Mass Spectroscopy, LC-MS, GC-MS, FTIR, Atomic Absorption Spectroscopy, and ICP-OES. The teacher will assess the presentations using a preformatted checklist and summarize the presentations.

The structured breakdown of this 10**-hour activity** ensuring smooth progression and student engagement may be as follows:

Review and Information Gathering (3 hours)

- Students are assigned one spectroscopic technique from UV Spectroscopy, Mass Spectroscopy, LC-MS, GC-MS, FTIR, Atomic Absorption Spectroscopy, and ICP-OES. They will visit the library and use the internet to collect information on Working principles, Instrumentation, and Applications, Advantages and limitations.

PowerPoint Presentation Preparation (3 hours)

- Using the gathered information, students will create a PowerPoint presentation (8–10 slides recommended), including visuals, diagrams, and examples, and ensure clarity and logical flow.

Student Presentations (3 hours)

- Each student presents their assigned spectroscopic technique to the class (approx. 20–25 minutes each including Q&A). The teacher uses a preformatted assessment checklist to evaluate for content accuracy, clarity, and depth, Presentation skills, and visual aids, and Engagement with the audience.

Summary and Reflection (1 hour)

- The teacher provides a comprehensive summary of all techniques covered, clarifies complex concepts highlights the comparative strengths and applications of each method, and opens the floor for student reflections or questions.

Experiential-Learning 2.3 : Techniques for Particle Size Analysis of Unani drugs

Total duration: 8 hrs

Students will be instructed to surf the web for videos on various instruments and prepare PPT and present before the class on X-ray Diffraction (XRD) Analysis; Energy-dispersive X-ray spectroscopy (EDS, EDX, or XEDS); Transmission Electron Microscopy (TEM); Scanning Electron Microscopy (SEM); Thermo gravimetric analysis (TGA); Atomic force microscopy (AFM); X-Ray Fluorescence Spectrometry (XRF) and X-Ray Fluorescence Spectrometry (XRF). They will submit their observations in the form of an assignment.

The structured breakdown of the 8-hour activity **is** designed to balance guided research, presentation, peer learning, and submission of assignments. The goal is to familiarize students with advanced analytical techniques used in material and drug analysis as follows:

Introduction & Group Allocation 2 Hours

- Importance of modern analytical instruments in research and drug analysis. Overview of the listed techniques XRD, EDX, TEM, SEM, TGA, AFM, XRF. Clarify expected outcomes: PPT + Observational Assignment
- Divide students into small groups or pairs. Allot or allow selection of one topic per group.

- Provide checklist: what to include in the PPT (working principle, instrumentation, applications, advantages, limitations). Explain referencing and plagiarism policy.

- Students begin gathering information from credible sources (e.g., NPTEL, YouTube, PubMed, and company websites like Bruker, and ThermoFisher).

Content Preparation 2 Hours

- Students collect videos, images, and factual data related to their topic. Note key observations for later assignment writing.
- Students work on creating their presentations (title slide, objective, principle, images/diagrams, video clips if needed, conclusion). the teacher visits each group to monitor progress and provide input.

Student Presentations (Part 1): 2 Hours

1. Presentations by Half the Groups

- Each group presents for 8–10 minutes. 2–3 minutes for Q&A and discussion. The teacher provides constructive feedback. Encourage peer comments and discussions on the techniques presented.

2. **Student Presentations (Part 2) + Assignment Submission: 2 Hours**

- Presentations by Remaining Groups and Submission of Observational Assignment. Each group submits a brief written assignment (observations, key learnings from their own and other groups' presentations).

Modular Assessment

Assessment method	**Hour**
Instructions: Conduct a structured modular assessment. The assessment will be for 50 for this module. Keep structured marking patterns. Use different assessment methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the modular grade point as per Table 6C. 1. Assignment-30 **Assessment Scheme for activity "** Techniques for Particle Size Analysis of Unani drugs" **(Total: 30 Marks)** 1. Presentation Content: 10 marks Accuracy, clarity, and completeness of the PPT—including principle, working, components, applications, and visuals (diagrams/videos). 2. Presentation Delivery: 5 marks Communication skills, teamwork, confidence, and handling of questions. Visual Design of PPT: 3 marks Slide layout, use of media, clarity, and overall neatness. Assignment Submission (Observations): 7 marks Key observations from research and peer presentations: clarity and reflection of understanding.	4

Survey & Source Quality: 5 marks Use of credible online sources (video links, academic content), proper referencing, or mention of sources. and 2. SAQ-(4 x 5 Marks) 20 Or Any practical in converted form can be taken for assessment. (25 marks) & Any of the experiential learning, such as portfolios, reflections, or presentations, can be taken as an assessment. (25 marks)	

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 3 : (Standardization of Single and Compound Formulations (Arq, Majoon, Safoof, Sharbat, Qurs, Habb, Roghan, Marham & Zimad)						
Module Learning Objectives **(At the end of the module, the students should be able to)** 1. Appraise Standardization of Single and Compound Unani Formulations 2. Conduct Shelf life and Stability studies of Compound Unani Formulations 3. Demonstrate adulteration of single drugs 4. Perform guided procedures on high-end instruments used in drug industries.						
Unit 1 (Process and Product Standardization) 3.1.1 General description of Process and Product Standardization **References:** 1,3,5,8,9,10						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 6,CO 8	Appraise Process Standardization of Unani drugs	2	Lecture	CC	Knows-how	L&PPT
CO 1,CO 3,CO 5,CO 6,CO 8	Describe Product standardization	2	Lecture	CC	Knows-how	L&PPT
CO 1,CO 3,CO	Demonstrate the SOPs for preparation and standardization of finished product	8	Practical3.1	PSY-GUD	Shows-how	PT

5,CO 6,CO 8						
CO 1,CO 3,CO 5,CO 6,CO 8	Appraise Pharmacopoeia standards of Unani Formulations	8	Experiential-Learning3.1	PSY-GUD	Shows-how	SDL

Unit 2 مطالعاتِ استحکام اور ادویہ کی مدت حیات (Stability studies and Shelf life)

3.2.1 Stability studies and Shelf life in Unani Medicine

References: 1,2,3,4,5,6,7,8,9

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 6,CO 8	Describe stability studies for ascertaining the shelf life of Unani Drugs	2	Lecture	CC	Knows-how	L
CO 1,CO 3,CO 5,CO 6,CO 8	Describe the stability and shelf life of Unani Drugs and differentiate between the two.	1	Lecture	CC	Knows-how	L&PPT
CO 1,CO 3,CO 5,CO 6,CO 8	Demonstrate the assessment of Aflatoxin contamination, Microbial contamination, Pesticide residue, and Heavy Metals in stability studies	6	Practical3.2	PSY-GUD	Shows-how	SIM
CO 1,CO 3,CO 5,CO 6,CO 8	Observe the instruments used for stability studies of Unani formulations	9	Experiential-Learning3.2	PSY-SET	Know	FV

Unit 3 ادویائی اوصاف پر اثرانداز ہونے والے عوامل (Factors affecting the quality of drugs)

3.3.1 Adulteration in Unani Medicine

References: 1,3,4,8

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 6,CO 8	Describe the Adulteration of crude drugs and the types of adultration.	1	Lecture	CC	Knows-how	L
CO 1,CO 3,CO 5,CO 6,CO 8	Appraise the Good Agricultural Practices (GAP) and their importance in drug standardization.	1	Lecture	CC	Know	L
CO 1,CO 3,CO 5,CO 6,CO 8	Reflect on the good storage conditions and transport of crude drugs	6	Experiential-Learning3.3	PSY-SET	Shows-how	DIS,FV,PAL,PL,PBL,RLE
CO 1,CO 3,CO 5,CO 6,CO 8	Demonstrate the adulteration of crude drugs	4	Practical3.3	PSY-GUD	Shows-how	PT,SY

Unit 4 ادویاتی صنعت کے رہنما دستور، معیاری طریقہ کار اور این اے بی ایل کی منظوری (GMP, SOPs and NABL accreditation)

3.4.1 Developing various SOPs

References: 1,3,6,8,9

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 6,CO 8	Enumerate Good manufacturing practices (GMP) and their importance for quality control of compound formulation.	1	Lecture	CC	Knows-how	L
CO 1,CO 3,CO 5,CO 6,CO 8	Demonstrate SOPs for various classical drug dosage forms of Unani medicine.	2	Practical3.4	PSY-GUD	Shows-how	PT
CO 1,CO 3,CO	Appraise the accreditation process of the National Accreditation Board for Testing and Calibration Laboratories (NABL)	3	Experiential-Learning3.4	PSY-SET	Knows-how	LS,PrBL,SDL

5,CO 6,CO 8						

Practical Training Activity

Practical 3.1 : Pharmacopoeial standardization of Hab/Qurs.

Total Hours 8

The student will be demonstrated by the teacher the various parameters for preparation and standardization of Hab/Qurs as per Pharmacopoeial parameters.

The structured breakdown of the 8-hour activity focused on the demonstration and understanding of preparation and standardization of *Hab* and *Qurs* (Unani dosage forms) as per pharmacopoeial standards.

Introduction & Raw Material Evaluation: 2 Hours

Introduction to Hab/Qurs

Definition, types, uses, and pharmacological significance along with the Importance of standardization in Unani medicine.

Parameters used for raw materials: identity, purity, ash value, extractive value, moisture content, etc.

3. Demonstration:

Evaluation of Raw Materials by Organoleptic examination, Microscopy (if applicable), Moisture content & Ash value analysis

Demonstration of Hab/Qurs Preparation: 2 Hours

Step-by-step Demonstration of Powdering of drugs (Sufuf), Preparation of binding agents (e.g., syrup, honey, starch), Making *Hab* (pills) and *Qurs* (tablets) using molds or hand-rolling, and Drying and storage guidelines

Students clarify doubts and discuss common errors in preparation and how to avoid them.

Standardization Parameters Post-Preparation: 2 Hours

Demonstration of Finished Product Testing like Weight variation, Disintegration time, Friability, Hardness (for Qurs), and Organoleptic properties (color, texture, odor). Students take notes and interpret outcomes about Unani Pharmacopoeia standards.

Review, Observation Submission & Feedback: 2 Hours

Summarize the entire preparation and standardization process. Emphasize clinical and quality relevance. Students compile detailed notes for submission: process steps, test results, and reflections. The teacher will review common observations. Highlight best practices to correct any misunderstandings and encourage the application of learning in future practical settings.

Practical 3.2 : Aflatoxin and Microbial contamination, Pesticide residue, and Heavy Metals assessment during stability studies

Total Hours: 6

The students will be explained the methods and procedure for estimation of Aflatoxin contamination, Microbial contamination, Pesticide residue, and Heavy Metals by video tutorials or simulation method or involving the student to observe the dissertation work of senior students while working on these parameters for quality assessment of the study drug. The students will note the observations in a preformatted checklist and submit it to the teacher.

The structured breakdown of the activity focused on quality assessment parameters like aflatoxins, microbial contamination, pesticide residues, and heavy metals is as follows:

Introduction & Method Demonstration (2 hours)

- The teacher introduces the importance and significance of testing for Aflatoxin contamination, Microbial contamination, Pesticide residue, and Heavy metals. Students are then shown video tutorials, and simulation modules, or allowed to observe senior students' dissertation work involving actual estimation methods. Key methods demonstrated may include TLC/HPLC for aflatoxins, Plate count or PCR methods for microbes, GC-MS for pesticides, and AAS/ICP-OES for heavy metals to gain a conceptual and visual understanding of various estimation techniques used in quality control of study drugs.

Observation & Checklist Completion (2 hours)

- Each student is given a preformatted observation checklist to use while watching or observing Methods used, Instruments involved, Sample handling, Safety protocols, and Interpretation of results. Students note key observations corresponding to each parameter tested to complete detailed and structured documentation of their observations aligned with each estimation method.

Submission & Teacher Review (2 hours)

- Students review their observations and submit the completed checklists to the teacher. The teacher reviews the submissions and provides a summary of key learning points, filling any gaps and reinforcing correct understanding to internalize the real-world application of these quality-control tests and submit a structured assignment.

Practical 3.3 : Adulteration of crude drugs

Total hours: 4

The teacher will demonstrate various samples of original drugs and adulterants before the students and enumerate the differences between selected samples. Each student will record the differences for at least two drug samples and the students present it as a symposium or group discussion. The teacher will assess the activity for summarizing and final comments. They will submit the final observations as practical records.

The structured breakdown of the activity focused on identifying original drugs vs adulterants and student-led discussion may be as follows:

Demonstration & Observation (2 hours)

- The teacher demonstrates various original drug samples alongside common adulterants, key differences are explained and highlighted, such as Physical appearance (color, texture, odor), Solubility, Reaction to simple chemical tests, and packaging and labeling cues.
- Students will observe and record distinguishing features for at least two drug samples, Note observations such as authenticity indicators vs signs of adulteration to build foundational understanding through direct visual and comparative learning, and prepare notes for discussion.

Group Discussion / Symposium & Teacher Assessment (2 hours)

- Students form small groups or panels and present their findings in the format of a symposium or guided group discussion, each student contributes by explaining the drugs they observed, differences noted, possible implications of adulteration, the teacher observes, assesses participation, and Summarizes the key points, and adds final comments and practical insights to engage students in collaborative learning, improve scientific communication, and reflect on real-world quality assurance concerns.

Practical 3.4 : SOPs for various classical drug dosage forms of Unani medicine.

Total hours: 2

Students will be demonstrated the development of various SOPs for the preparation of Arq, Majoon, Safoof, Sharbat, Qurs, Habb, Roghan, Marham & Zimad. They will be instructed to prepare elaborate algorithms for the processes and submit them as charts.

The well-organized breakdown of the activity focused on developing Standard Operating Procedures (SOPs) for traditional Unani dosage forms:

SOP Demonstration & Process Understanding (1 hour)

- The teacher demonstrates the preparation procedures for various Unani formulations of Arq, Majoon, Safoof, Sharbat, Qurs, Habb, Roghan, Marham, and Zimad.
- For each dosage form, the teacher explains Raw material handling, Step-by-step processing, Equipment used, and Standardization and storage procedures.

- Students will take detailed notes of each process and identify the critical control points and quality checks to gain a clear understanding of the full SOP for each preparation method.

Algorithm Design & Chart Submission (1 hour)

- Students use their notes to design flowchart-style algorithms for at least a few of the demonstrated formulations, each algorithm should clearly show the sequential steps including decision points, time/temperature conditions, and any standardization criteria. The final output is submitted as visually organized charts (digital or paper format) to reflect their grasp of formulation procedures and SOP design.

Experiential learning Activity

Experiential-Learning 3.1 : Pharmacopoeia Standardization of Unani Formulations

Total hours: 8

1. Each student is instructed to go to the library/digital library to collect Pharmacopoeia standards for Majoon, Arq, Roghan, Safoof, Marham, Zimad, Jawarish, and Sharbat. Prepare a PPT and present it before the class. **4 hours**

2. Students will instructed to review at least two research publications on each dosage form for Pharmacopoeia standards for standardization and submit it as an assignment. **4 Hours**

Experiential-Learning 3.2 : Instruments used for assessing the stability studies of Unani Formulations

Total hours: 9

The teacher will accompany students to the pharmaceutical industry/Institute/Drug Testing labs for hands-on training on instruments used for assessing the stability studies of Unani Formulations. The students will take note of the observations and prepare a class presentation on the same. The teacher will conclude and summarise.

The structured breakdown of the 9-hour activity designed to combine industrial exposure, observation, and academic reflection related to stability studies of Unani formulations is as follows:

Industrial/Institutional Visit & Demonstration: 3 Hours

- Welcome session at the pharmaceutical industry/institute/drug testing lab.A brief introduction to stability studies and importance in Unani formulations.
- Live demonstration of key instruments used in stability testing, such as Stability Chambers, UV-Vis Spectrophotometer, pH Meter, Moisture Analyzers, HPLC (if applicable), and Humidity/Temperature Sensors
- Explanation of how these tools are used to monitor shelf-life, efficacy, and safety of Unani products.

- Students interact with lab personnel or scientists. Clarify doubts and ask questions about practical applications.

Observation Review & Presentation Preparation: 3 Hour

- Back in the classroom/lab divide students into small groups based on observation focus (e.g., pH monitoring, environmental control, HPLC use, etc.).
- Students discuss and compile key observations from the visit. Note the purpose and function of instruments, conditions monitored, and relevance to Unani formulations.
- Students create presentations summarizing their findings. Include photos (if allowed), diagrams, workflow of stability testing, and takeaways.

Student Presentations & Teacher Conclusion: 3 Hours

- Each group presents (8–10 minutes). Presentations should cover an Introduction to the instrument(s), its Role in stability testing, Observations from the industry visit, and Relevance to Unani formulations. A Q&A session after each presentation will be followed. The teacher will recap key techniques and their importance in ensuring quality and safety Connecting practical learning to classroom theory.

Experiential-Learning 3.3 : Storage and transport of crude rugs

Total hours: 6

The teacher will accompany students to the pharmaceutical industry/Institute/Drug Testing labs/in-house pharmacy to provide them with onsite experience about the methods employed for the good storage conditions and transport of crude drugs. The students will record their observations in the form of a preformatted checklist and submit it to the teacher as an assignment.

The structured breakdown of the activity focusing on onsite learning about the storage and transport of crude drugs is as follows:

Site Visit & Onsite Demonstration (2 hours)

- The teacher accompanies students to a pharmaceutical industry, institute, drug testing lab, or in-house pharmacy. At the site, students are shown real-time practices for storage of crude drugs (temperature, humidity control, packaging, pest control, segregation), and transport methods (labeling, preservation during transit, container types, handling protocols) to gain firsthand exposure to professional handling of crude drug storage and logistics.

Observation & Checklist Completion (2 hours)

- Students use a preformatted observation checklist provided by the teacher to record specific details and protocols observed onsite, note deviations or best practices, and mark elements like safety measures, documentation, environmental conditions, etc., to compile a structured and comprehensive record of their observations.

Reflection, Assignment Submission & Discussion (2 hours)

- Students finalize their checklists into formal assignment submissions. the teacher reviews the submissions and conducts a brief classroom discussion, summarizing key takeaways, Common observations, and real-world relevance of good storage and transport practices to reinforce learning through documentation and teacher-guided reflection.

Experiential-Learning 3.4 : Accreditation process of the NABL

Total 3 hours

The teacher will instruct the students to collect the various documents related to the process of NABL accreditation. They will also visit the NABL-accredited laboratory of the institution or a nearby reputed institution and observe the NABL standard criteria for accreditation and observations noted in a preformatted schedule. The student will also search and watch videos on the NABL accreditation process, compare it with the observations obtained from the laboratory, and submit the activity in the form of a flow chart the same as a poster.

The breakdown of the activity focusing on the NABL accreditation process as below:

Review, Observation & Data Collection (1.5 hours)

- The teacher gives an overview and instructions on What NABL (National Accreditation Board for Testing and Calibration Laboratories) accreditation involves, the types of documents, and the standard criteria students need to collect and observe.
- Students will collect documents related to NABL processes (manuals, SOPs, quality policies, etc.), visit a NABL-accredited laboratory (within the institution or nearby), observe and record findings on NABL standard criteria using a preformatted schedule (e.g., cleanliness, documentation, calibration standards, internal audits)and also search and watch videos on NABL accreditation to understand the theoretical workflow so that students compile field and theoretical data, providing a holistic view of NABL requirements.

Analysis, Comparison & Poster Preparation (1.5 hours)

- Students compare their lab visit observations with what they saw in the video or read in documents, create a flowchart of the NABL accreditation process incorporating key procedural steps, documentation needs, audit and compliance steps, and field observations, and design the output as a poster-style submission, either digitally or on paper.

Modular Assessment

Assessment method	**Hour**
Instructions: Conduct a structured modular assessment. Assessment will be for 50 for this module. Keep structured marking patterns. Use different assessment methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the modular grade point as per Table 6C. 1. Practical: 30 marks Here is a 30-mark assessment scheme for the activity involving the demonstration and observation of the preparation and standardization of *Hab* and *Qurs* according to pharmacopoeial parameters. **Assessment Scheme (Total: 30 Marks)** **Understanding of the Process: 8** marks • Ability to describe steps of *Hab/Qurs* preparation, ingredients used, and methods followed as per pharmacopeia. **Observation Accuracy: 6** marks • Clarity, detail, and correctness of recorded observations during the demonstration. **Knowledge of Standardization Parameters: 6** marks • Understanding and identification of post-preparation tests (e.g., weight variation, disintegration time, hardness). **Practical Note Submission: 5** marks • Completeness, organization, and neatness of notes/practical records.	4

Participation & Interaction: 5 marks • Active involvement during the session, asking relevant questions, and engaging in discussions. 2. Viva: 20 marks Or Any practical in converted form can be taken for assessment. (25 marks) & Any of the experiential learning, such as portfolios, reflections, or presentations, can be taken as an assessment. (25 marks)	

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 4 : تجربانی علم الادویہ کے مبادیات (Essentials of Experimental Pharmacology)						
Module Learning Objectives **(At the end of the module, the students should be able to)** 1. Describe the classical methods of drug development and correlate them with current drug discovery and development 2. Discuss various stages of drug discovery 3. Elucidate characteristics, handling, and experimental uses of different laboratory animals used in drug discovery 4. Demonstrate various experimental techniques on laboratory animals using simulation software 5. Appraise the importance of animal ethics in experimental research						
Unit 1 ادویہ کے نمو و ارتقاء کے روایتی طریقے (Classical Method of Drug Development) 4.1.1 Scope of animal research in Unani medicine 4.1.2 Galen's Experiments for developing Tiryaq (Antidotes) 4.1.3 Experimentation in the light of Muqaddima Kitab al Mia 4.1.4 Ibn Sina Protocol for Experimentation 4.1.5 Ibn Rushd's Drug Development Methodology **References:** 10,11,12,13						
3A	3B	3C	3D	3E	3F	3G

CO 3,CO 5,CO 7	Discuss the scope and limitations of animal research in Unani Medicine	1	Lecture	CC	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 7	Identify the Scope of Animal Research in Unani Medicine	1	Practical4.1	CC	Knows-how	DIS,PL
CO 1,CO 3,CO 5,CO 7	Analyse Experimentation in the light of Muqaddima Kitab al Mia and Galen's Experiment for Developing Tiryaq (Antidotes).	1	Lecture	CAN	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 7	Appraise Ibn Sina Protocol for Experimentation and Ibn Rushd's Drug Development Methodology.	4	Experiential-Learning4.1	CC	Knows-how	FC,PL

Unit 2 ادویہ کی تلاش اور اس کے ارتقاء میں ماقبل سریر یائی تحقیقات کا جائزہ (Overview of preclinical research in drug discovery and development)

4.2.1 Define preclinical research

4.2.2 Types of preclinical research

4.2.3 Significance of Preclinical Research, Drug discovery and development process

References: 10,11,12,13

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 7	Describe preclinical research and differentiate between *in vitro*, *in vivo*, and *in silico* models	1	Lecture	CC	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 7	Illustrate the phases of drug development	1	Practical4.2	CC	Knows-how	CBL,DIS,IBL
CO 1,CO 3,CO 5,CO 7	Illustrate various phases of drug discovery and development	4	Experiential-Learning4.2	CK	Knows-how	D,FC,JC

Unit 3 تجربائی علم الادویہ میں مستعمل تجربہ گاہی حیوانات (Laboratory Animals in Experimental Pharmacology)

4.3.1 Common laboratory animals, characteristics, handling, and experimental uses of different species and strains

4.3.2 Factors affecting drug responses in laboratory animals

4.3.3 Dose translation from humans to animals/animals to humans

4.3.4 Limitations of animal experimentation

References: 10,11,12,13

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 7	Categorize the characteristics of various strains of rat, mouse, rabbit, and guinea pig	1	Lecture	CC	Knows-how	L,L&GD,L&PPT ,L_VC,PER
CO 1,CO 3,CO 5,CO 7	Discribe the experimental uses of rat, mouse, rabbit and guinea pig	1	Lecture	CC	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 7	Describe various factors that affect the responses of drugs in laboratory animals	1	Lecture	CC	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 7	Appraise the dose translation and explain the dose conversion factor	1	Lecture	CAP	Knows-how	L,L&GD,L&PPT ,L_VC,PER
CO 1,CO 3,CO 5,CO 7	Draw a flow diagram of various factors affecting drug response in animals	4	Practical4.3	CC	Knows-how	PL,PER
CO 1,CO 3,CO 5,CO 7	Estimate the dose for animals from the human therapeutic dose	4	Practical4.4	CAP	Shows-how	CBL,D,DA,L,L&GD,L&PPT ,PT,PBL
CO 1,CO 3,CO 5,CO 7	Differentiate commonly used laboratory animals for research in Unani medicine	8	Experiential-Learning4.3	AFT-VAL	Shows-how	DL,EDU,FV,PL

Unit 4 عمومی تجربہ گاہی سہولیات (Common Laboratory Techniques)

4.4.1 Routes of drug administration and vehicles used for drug administration through various routes

4.4.2 Techniques of withdrawal of blood samples from animals

4.4.3 Methods of anaesthesia and euthanasia for laboratory animals and anaesthetic agents used for laboratory animals

References: 1,11,20,35,36

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 7	Describe various routes of drug administration in Laboratory animals and techniques of blood sample collection from laboratory animals	2	Lecture	CC	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 7	Demonstrate various routes of drug administration using simulated software.	4	Practical4.5	PSY-GUD	Shows-how	L_VC,SIM
CO 1,CO 3,CO 5,CO 7	Demonstrate various blood withdrawal techniques using simulated software	4	Practical4.6	PSY-GUD	Shows-how	PT,SIM
CO 1,CO 3,CO 5,CO 7	Demonstrate different methods of anaesthesia and euthanasia in laboratory animals	2	Practical4.7	PSY-GUD	Shows-how	L&PPT ,L_VC,PL,PER,SIM
CO 1,CO 3,CO 5,CO 7	Explore the different Routes of Drug Administration in animals	3	Experiential-Learning4.4	PSY-GUD	Shows-how	L_VC,PT,SIM,TUT
CO 1,CO 3,CO 5,CO 7	Illustrate various methods of anaesthesia for small animals	3	Experiential-Learning4.5	CAP	Shows-how	L,L&GD,L&PPT ,L_VC,PT,PER,PrBL,SDL,TBL

Unit 5 تجربہ گاہی جانداروں کے رکھ رکھاؤ، تجربہ سے متعلق حیوانی اخلاقیات او سی سی ایس ای اے کے رہنما اصول وضوابط (Laboratory animal ethics and CCSEA guidelines for laboratory animal handling and experimentation)

4.5.1 Importance of laboratory animal ethics in experimental research

4.5.2 Committee for Control and Supervision of Experiments on Animals (CCSEA) guidelines for laboratory animal handling and

experimentation

References: 10,11,12,13

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 7	Describe the importance of animal ethics in experimental research and CCSEA guidelines.	1	Lecture	CC	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 7	Demonstrate the functioning of IAEC	4	Experiential-Learning4.6	CC	Shows-how	RP,SDL,TBL

Practical Training Activity

Practical 4.1 : Animal experiments for testing drugs in classical literature

Total duration: 1 hrs

The teacher will demonstrate the students various extracts from Unani classical literature that mentions various experiments on animals concerning antidotes and Mizaj alterations, Then students will be divided into different groups and each group will be instructed to survey the literature of Unani medicine that has mentions of testing drugs in animals. They will write the observations to identify the scope of animal research in Unani medicine, prepare a charts of the same, and submit it to the teacher.

Practical 4.2 : Phases of drug development of given drug.

Total Hours: 1

The teacher will assign each student a drug that has already been developed and instruct the student to collect the history of its development process. Prepare a chart of the landmark events in its development process and submit it to the teacher.

Practical 4.3 : Various factors affecting drug response in animals

Total Hours: 4

The teacher will instruct the students to survey books, journals, and manuals to note various factors that affect the drug response in animals. Students will prepare a flow diagram under the guidance of the teacher of all factors affecting the drug response and will submit it to the teacher as a flow chart.

The organized breakdown of this activity focused on surveying factors affecting drug response in animals and presenting them in a flow chart:

Literature Survey & Factor Identification (2 hours)

- The teacher introduces the concept of variability in drug response among animals and explains its relevance in pharmacological studies. Students are instructed to survey books, journals, and standard manuals to identify key factors influencing drug response, such as Species and strain differences, Age, sex, and weight, Nutritional status, Genetic variations, Environmental conditions (e.g., temperature, light), Stress and handling, Disease state, and Drug interactions. Students take notes and list relevant points for each category.

Flow Diagram Preparation & Submission (2 hours)

- Under the guidance of the teacher, students organize their findings into a structured flow chart, using logical groupings or hierarchical diagrams. The flow diagram should clearly show the main categories (e.g., biological, environmental, experimental), subfactors under each category, and relationships or dependencies (if any). The finalized flow chart is submitted to the teacher as part of their practical record.

Practical 4.4 : Translation of human therapeutic dose across species

Total hours; 4

The teacher will demonstrate the calculation of the dose of a drug in animals from the human therapeutic dose. Then the teacher will assign a drug to the students. The students will survey the literature for its median effective dose in human dose. Students will be instructed to calculate the dose for the rats, mice, and rabbits by body surface area conversion method and compare the conversion method and dose mentioned documented in surveyed literature. The students will present their observations in the form of practical records.

The structured breakdown of this practical focused on dose calculation from human to animal models using the body surface area (BSA) method is as follows:

Demonstration & Literature Survey (2 hours)

- The teacher demonstrates how to calculate animal doses from human therapeutic doses using the Body Surface Area (BSA) conversion method including an explanation of conversion factors (Km values) for rats, mice, rabbits, etc., and the formula used. The students are each assigned a different drug. They are instructed to survey the literature to find the median effective human dose (ED50 or therapeutic dose) and any available animal dose data for comparison to understand the mathematical and biological basis for interspecies dose conversion and start compiling relevant information.

Dose Calculation, Comparison & Practical Record Submission (2 hours)

- Students use the gathered data to calculate the equivalent doses for rats, mice, and rabbits using the BSA method. They then compare the calculated dose with the actual doses reported in animal studies from the literature. Students compile their work into a practical record, which includes drug name and human dose, calculated doses for different species, comparative analysis with documented animal doses, and any observed variations or insights to demonstrate applied understanding of dose translation and critical evaluation of preclinical data across species.

Practical 4.5 : Various routes of drug administration using simulated software.

Total duration: 4 hrs

The teacher will explain the various method of drug administration in rodents by multiple routes. The student will perform the experiment using simulation.

Practical 4.6 : Different methods of anaesthesia and euthanasia in laboratory animals using simulation.

Toal duration: 4 hrs

The teacher will demonstrate the methods of anesthesia and euthanasia in small animals or the student will demonstrate anesthesia and euthanasia in small animals using simulation. They will then practice the same under the supervision of the teacher. They will record their observations and submit them as a practical record.

Practical 4.7 : Blood withdrawal techniques and simulated software

Total duration: 2 hrs

The teacher will demonstrate various blood withdrawal techniques in the animal house while working on research proposals of the senior students approved by CCSEA or through simulation. The students will observe the demonstration keenly. Then they will be asked to compile their observations on the methods, advantages, disadvantages, and limitations of different routes of drug administration in animals and submit the same. as a practical record.

The structured organization of the activity focused on blood withdrawal techniques and drug administration routes in animals is as follows:

Demonstration & Observation (1 hour)

- The teacher demonstrates various blood withdrawal techniques used in small laboratory animals, either live in the animal house (during CCSEA-approved senior student research) or through high-quality simulation models or video demonstrations. Techniques may include Tail vein sampling, Retro-orbital bleeding, Cardiac puncture, and Saphenous or jugular vein sampling.
- Students keenly observe each technique, noting the Method, Restraint technique used, Safety measures, Volume and frequency considerations, and Species-specific practices to understand real-world or simulated techniques used for ethical and scientific blood withdrawal in animals.

Compilation & Practical Record Submission (1 hour)

- Students are instructed to compile their observations and insights into a practical record, focusing on different routes of drug administration (oral, IV, IP, SC, IM, etc.), advantages, disadvantages, and limitations of each route, and relevance to specific animal species and research needs. The practical record may include tables, bullet points, or comparative charts for clarity. Students then submit their records for assessment.

Experiential learning Activity

Experiential-Learning 4.1 : Experimental protocols in Unani Medicine

Total duration: 4 hrs

Students will study the methods described by Ibn Sina and Ibn Rushd from the classical books and will prepare a critical appraisal with a current scientific perspective as a PPT presentation. They will then present the same in the classroom.

The breakdown of this activity focuses on classical Experimental methods by Ibn Sina and Ibn Rushd and their critical appraisal with present scientific insights:

Literature Study & Critical Appraisal Preparation (2 hours)

- The teacher introduces the contributions of Ibn Sina (Avicenna) and Ibn Rushd (Averroes) to formal experimentation in Ilmul Advia. Students are instructed to study the classical texts (translated or referenced) to understand the experimental methods described by the scholars.
- Under guidance, students begin preparing a critical appraisal by comparing classical experimental methods in Ilmul Advia with current scientific principles, highlighting concepts that align with or differ from modern understanding of experiments, and Identifying any historically significant insights that have contemporary relevance, Students start designing a PowerPoint presentation to organize their findings to develop a thoughtful and comparative understanding of classical methods of the experimentation in the light of present methods.

PPT Presentation & Classroom Discussion (2 hours)

- Students present their PowerPoint presentations in the classroom. Each presentation includes a summary of the classical method studied, critical appraisal (strengths, gaps, scientific value today), and personal or group reflections on relevance to modern medicine. After each presentation, a brief Q&A or discussion is held to encourage peer learning and critical thinking. The teacher concludes with a summary of key learnings and academic feedback on content and presentation to articulate and present a well-researched comparison between classical and contemporary methods of experimentation.

Experiential-Learning 4.2 : Various phases of drug discovery and development

Total duration: 4 hrs

The student will be instructed to search the literature with MeSH words for drug discovery, drug development, and preclinical studies to explore the significance of these studies. **(2 Hours)**

hey will note various observations in each of the phases of drug development and will present them in the class as a PPT presentation. The teacher will assess the presentation with a pre-formatted checklist and will finally summarise and conclude the presentations. **(2 Hours)**

Experiential-Learning 4.3 : Laboratory animals for research in Unani medicine

Total duration: 8 hrs

The students will be instructed to refer to literature on various small animals used for experimentation in animal houses. Students will be deputed to a nearby animal facility, where they will see various strains of laboratory animals and note the differentiating features of the animals. Students will write down the observations in the preformatted checklist and submit them to the teacher as an assignment.

The structured breakdown of the activity centered on learning about small laboratory animals and observing them in a real facility is as follows:

Literature Review & Preparation (2 hours)

- The teacher gives an introduction to the importance of lab animals in experimental research. Students are instructed to refer to standard literature sources and learn about commonly used small animals (e.g., mice, rats, guinea pigs, rabbits, hamsters, etc.), Different strains and breeds, physical features, behavior, and their scientific uses to build foundational knowledge to prepare for observational work at the animal facility.

Visit to Animal Facility & Observation (2 hours)

- Students are taken to a nearby animal house/facility. They observe various small laboratory animal species and strains, noting coat color, size, body shape, Behavioral patterns, housing and environmental conditions, and species/strain-specific identification markers to have firsthand exposure to live animals helping students connect theory with real-life differences between strains/species.

Documentation in Preformatted Checklist (2 hours)

- Students fill in a preformatted checklist, documenting observations such as animal species/strain, physical characteristics, unique identifiers, housing/environmental setups, and any notable behavioral observations to compile an organized, detailed record of their observations for academic assessment.

Assignment Submission & Review Session (2 hours)

- Students finalize and submit their checklists/assignment reports to the teacher. A classroom review or discussion is conducted, where students share what they observed, discuss differentiating features, and clarify any doubts about animal handling, strain use, or breeding practices. The teacher summarizes key points and corrects any misconceptions to reinforce understanding through group discussion and teacher feedback.

Experiential-Learning 4.4 : Routes of drug administration in animals

Total duration: 3 hrs

The teacher will instruct the students to visit the library and survey literature/videos, etc concerning the route of drug administration in animals. Students will be asked to compile information on the methods, advantages, disadvantages, and limitations of different routes of drug administration in animals and submit the same as an assignment on the same

The structured breakdown of the activity focused on surveying resources on routes of drug administration in animals:

Literature & Multimedia Survey: 1.5 Hours

- A brief explanation of the task by the teacher to Identify various routes of drug administration (e.g., oral, intravenous, intraperitoneal, subcutaneous, etc.) and Focus on methods, advantages, disadvantages, and limitations. The teacher will give Instructions on referencing reliable sources: textbooks, pharmacology manuals, research articles, and educational videos.

- Students work individually or in small groups to access books, journals, or e-resources, Watch explanatory videos or animations demonstrating different administration techniques, and take notes in a structured format (route-wise comparison chart or summary table).

Compilation & Assignment Preparation: 1.5 Hours

- Students organize the collected information into a coherent format. The suggested format may be an Introduction, Table/chart comparing routes, Summary of pros and cons, and limitations and application context in animal studies
- Submit the compiled assignment. peer sharing or short discussion sessions to exchange key findings, and the teacher wraps up by highlighting essential learning points and addressing questions.

Experiential-Learning 4.5 : Methods of anaesthesia for small animals.

Total duration: 3 hrs

The teacher will instruct the students to collect information from various sources from the library related to anesthesia methods on small animals. Students will be instructed to prepare an e-poster describing various anesthetic techniques, applications, and their limitations.

The structured breakdown of the activity focused on anesthesia methods for small animals and e-poster creation is as follows:

Review & Information Collection (1.5 hours)

- The teacher gives an overview of anesthesia in small animals, including Importance and ethical considerations, types of anesthetic techniques (inhalational, injectable, local), and factors influencing anesthetic choice (species, procedure type, duration)
- Students are then instructed to collect information from multiple library sources such as reference books, research articles, manuals, and institutional SOPs. The focus areas for students will be common anesthetic agents used, techniques and equipment (e.g., isoflurane chamber, ketamine-xylazine mix), applications (e.g., surgery, sample collection), and limitations and potential risks to gather the content necessary for their e-poster, guided by a structured research approach.

Experiential-Learning 4.6 : Mock IAEC meeting

Total duration: 4 hrs

The teacher will form a mock IAEC committee comprising students. Students will go through the CCSEA standard operating procedures for the functioning of the Institutional Animal Ethics Committee and the roles and responsibilities of the members. One student will present the protocol, and committee members will analyze it and critically assess the proposal. The teacher will conclude and summarise.

The organized breakdown of the activity focused on simulating the functioning of an Institutional Animal Ethics Committee (IAEC) as per CCSEA guidelines is as hereunder:

Orientation & Committee Roleplay Setup (2 hours)

- The teacher introduces the structure, function, and significance of the IAEC as per CCSEA (Committee for the Control and Supervision of Experiments on Animals) SOPs. Students are provided with or asked to access the standard operating procedures, including the composition of the IAEC, roles, and responsibilities of various members (scientist, non-scientist, veterinarian, CPCSEA nominee, etc.), and ethics protocol review process.
- Mock IAEC Committee Formation will be carried out by assigning roles based on the IAEC structure to the students. One student prepares and is assigned to present a research protocol involving animal use.

Mock Protocol Review & Final Discussion (2 hours)

- The selected student presents the research protocol to the mock IAEC. Committee members (students in assigned roles) will ask relevant questions, critically analyze the scientific, ethical, and animal welfare aspects, and discuss possible modifications or concerns. They will refer to CCSEA norms while debating the protocol's approval.

- The teacher concludes the activity by summarizing key observations, Highlighting the correct application of ethical principles, and providing feedback on student participation and critical thinking to gain practical insight into ethical review processes and animal research governance.

Modular Assessment

Assessment method	Hour
Instructions: Conduct a structured modular assessment. This module's assessment will be for 50 points. Keep structured marking patterns. Use different assessment methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the modular grade point as per Table 6C. 1. Experiential Learning: 30 marks The 30-mark assessment scheme for the activity where students research and compile information on the routes of drug administration in animals based on literature and video surveys is as follows: **1. Content Accuracy & Completeness: 10** marks Accurate identification of various routes; detailed description of methods, advantages, disadvantages, and limitations. **2. Organization & Presentation of Assignment: 6** marks Well-structured document (headings, tables, charts), logical flow of information, clarity, and neatness. **3. Depth of survey: 6** marks Use diverse sources (books, articles, videos), evidence of comparison, and critical thinking. **4. Originality & Effort: 4** marks • Unique insights, paraphrased content (not copy-pasted), and student effort are evident in the compilation. **5. Timely Submission & Formatting: 4** marks • Submitted on time, followed instructions (length, format, references, etc.).	4

2. MCQ: 20 Marks Or Any practical in converted form can be taken for assessment. (25 marks) & Any of the experiential learning, such as portfolios, reflections, or presentations, can be taken as an assessment. (25 marks)	

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 5 : ادویاتی چھان بین، حیاتیاتی جانچ اور دیگر طریقہ کلا (Pharmacological Screening, Bioassay and Alternative Models)						
Module Learning Objectives **(At the end of the module, the students should be able to)** 1. Enumerate various bioassay methods for the screening of Unani drugs 2. Describe various emerging techniques in the drug discovery process 3. Justify the importance of alternatives to animal experimentation for the screening of Unani drugs						
Unit 1 ادویاتی چھان بین (Drug Screening) 5.1.1 General Consideration in Drug Screening 5.1.2 Simple, Programmed, and Blind Screening 5.1.3 High-throughput screening **References:** 10,11,12,13,14,18,19,20,21,22,23						
3A	3B	3C	3D	3E	3F	3G
CO 3,CO 5,CO 7	Describe drug screening and its types: simple, programmed, blind, and high-throughput screening	2	Lecture	CC	Knows-how	BL,L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 7	Prepare a protocol for blind screening identifying the underlying principles.	4	Practical5.1	CC	Knows-how	BL,BS,DIS,FC,JC,L&PPT ,L_VC
CO 3,CO 5,CO 7	Discuss the process of high-throughput screening	4	Experiential-Learning5.1	CC	Knows-how	JC,L,L&GD,L&PPT ,LS,PL,TBL,TUT

Unit 2 ادویہ عصبانیہ کی چھان بین(Neuropharmacological Screening)

5.2.1 Neuropharmacological Studies

5.2.2 Functional Observational Battery

5.2.3 Irwin's Profile

References: 18,19,20,21,22

3A	3B	3C	3D	3E	3F	3G
CO 2,CO 3,CO 5,CO 6	Describe neuropharmacological studies Explain the characteristics of gross behaviour test	2	Lecture	CC	Knows-how	L,L&GD,L&PPT ,L_VC,PER
CO 2,CO 3,CO 5,CO 6	Illustrate the components of Irwin's Profile and Enlist various parameters of Functional Observational Battery	4	Practical5.2	CAP	Shows-how	D,DL,D-M,L,L&GD,L&PPT ,L_VC,SIM,TBL

Unit 3 حیاتیاتی جانچ(Bioassay)

5.3.1 Scope, Principles, Types of Bioassay

5.3.2 Designing of Bioassay

References: 18,19,20,21,22,23,28

3A	3B	3C	3D	3E	3F	3G
CO 3,CO 5,CO 6	Describe the scope, principle and methods of Bioassay,	1	Lecture	CC	Knows-how	L,L&GD,L&PPT ,L_VC
CO 2,CO 3,CO 5	Design a protocol to screen a Unani drug with four-point Bioassay method	2	Practical5.3	PSY-GUD	Shows-how	D,DL,D-M,EDU,PT,TBL
CO 2,CO 3,CO 5	Enlist recent advances in Bioassay Techniques	4	Experiential-Learning5.2	CC	Knows-how	DIS,JC,L,L&GD,LS,PL

Unit 4 علیحدہ اور الگ کئے السجہ پر تجربات(Isolated Tissue Experiments)

5.4.1 Setup of isolated tissue preparation

5.4.2 Methods of Recording Tissue Response

5.4.3 Limitations of isolated tissue experiments

References: 10,11,12,13,18,19,20,27,28

3A	3B	3C	3D	3E	3F	3G
CO 2,CO 3,CO 5	Describe the importance of isolated tissue preparations Explain the advantages and disadvantages of isolated tissue studies	1	Lecture	CAP	Knows-how	D-M,L,L&GD,L&PPT ,L_VC,SIM
CO 2,CO 3,CO 5	Discuss various types of tissues used for isolated tissue preparation	1	Lecture	CAP	Knows-how	L,L&GD,L&PPT ,L_VC
CO 2,CO 3,CO 5	Demonstrate the Organ bath system	2	Practical5.4	PSY-GUD	Shows-how	D,DL,D-M,SIM,TUT
CO 2,CO 3,CO 5	Discuss the preparation of Physiological salt solution	2	Practical5.5	PSY-GUD	Shows-how	PT
CO 2,CO 3,CO 5	Demonstrate the dose-response curve of Acetylcholine using simulation software	2	Practical5.6	PSY-GUD	Shows-how	L&GD,L&PPT ,L_VC,PrBL,SIM
CO 2,CO 3,CO 5	Discuss various types of Physiological salt solutions, their applications and the role of different ingredients	4	Experiential-Learning5.3	CAP	Knows-how	PAL,PL,PT,SDL,SIM,TBL,TUT
CO 2,CO 3,CO 5	Explain the principle of physiograph and recording of tissue response	4	Experiential-Learning5.4	CC	Knows-how	DIS,FC,L_VC,SIM
CO 2,CO 3,CO 5	Demonstrate the dose-response curve of Serotonin on isolated Rat stomach (fundus part) strip using simulation	2	Experiential-Learning5.5	PSY-GUD	Shows-how	L_VC,SIM

Unit 5 Concept of 3R's and alternatives to animal experiments

5.5.1 In-silico methods

5.5.2 Cell-based assay

5.5.3 C. elegans as a model

5.5.4 Zebrafish embryo as a model

5.5.5 Non-animal approaches for testing Skin irritation and Skin Sensitization

References: 10,11,12,13,20,23

3A	3B	3C	3D	3E	3F	3G
CO 2,CO 3,CO 5,CO 6	Define 3R' concept Discuss Replacement, Reduction and Refinement Discuss various measures to reduce the number of animals in an experiment Describe the alternatives to animal experiments and the importance of *in silico* studies Discuss the cell-based assays and their applications Describe the characteristics and application of *C. elegans* Describe the characteristics and application of Zebrafish embryo model	3	Lecture	CE	Knows-how	L&GD,L&PPT ,L_VC,PER
CO 2,CO 3,CO 5,CO 6	Enlist the measures of refinement in animal research	4	Experiential-Learning5.6	CC	Knows-how	EDU,FC,TBL,TUT
CO 2,CO 3,CO 5,CO 6	Demonstrate the procedure of cell-based cytotoxicity assay	4	Practical5.7	CC	Knows-how	BL,D-M,L,L&GD,L&PPT ,L_VC,PER,SIM

CO 2,CO 3,CO 5,CO 6	Enumerate various alternative methods for testing skin irritation and skin sensitization	4	Experiential-Learning5.7	CC	Knows-how	D-M,DIS,FC,L&PPT ,SDL,SIM,TUT

Practical Training Activity

Practical 5.1 : Protocol for blind screening

Total duration:4 hrs

The teacher will demonstrate a protocol for blind screening. Then the teacher will divide the students into small groups and provided with study material. Each group will be assigned to design a protocol for the blind screening of a drug that will be presented as a presentation in the class.

We can break this practical on blind screening protocol design as folloews:

Demonstration & Group Assignment (2 hours)

- Teacher explains the concept of blind screening, its importance in unbiased drug evaluation, and typical applications (e.g., CNS effects, analgesic, anxiolytic, etc.). Key elements to be discussed are Randomization, Blinding (single/double), Use of controls, and Objective endpoints
- Teacher walks through a standard protocol for blind screening of a known drug (e.g., anxiolytic screening using Elevated Plus Maze without revealing the test substance identity) laying emphasis on study design, test parameters, blinding method, and ethical considerations.
- Students are divided into small groups (3–5 members each). Teacher provides study material (e.g., sample methods, test models, blank protocol templates).
- Each group selects a drug class or target effect (e.g., analgesic, anti-inflammatory, sedative, antidepressant), begins outlining their own blind screening protocol, including aim and hypothesis, animal model or test system, dosing and blinding procedure, parameters to measure, and evaluation methods.

Finalization & Presentations (2 hours)

- Groups complete and polish their protocols, integrating key elements learned above and prepare a presentation (e.g., 5–7 slides) outlining the protocol clearly.
- Each group presents their protocol (approx. 10 minutes each). Presentation should include objective of the blind screening, methodology and blinding technique, animal model/test system, evaluation parameters, expected outcome and rationale.
- Teacher gives constructive feedback on each protocol, summarizes best practices and common pitfalls in blind screening study design, emphasizes the role of blinding in ensuring objectivity and scientific validity.

Practical 5.2 : Irwin’s Profile and Functional Observational Battery

Total Hours: 4

The teacher will show the video and explain various parameters to be recorded in the Irwin test and Functional Observational Battery to assess the general effects of a test substance on central nervous system activity and physiological functions. Students will prepare a format to assess clinical signs for different categories of animal behaviour.

Ther breakdown of the practical, focusing on the Irwin Test and Functional Observational Battery (FOB) for assessing CNS activity and physiological functions is as follows:

Instruction & Understanding (2 hours)

- Teacher gives an overview of why CNS and physiological function assessments are important in toxicology studies and introduction to Irwin Test and FOB as standard methods.
- Teacher plays a video demonstrating both Irwin Test and FOB assessments. While the video is playing, the teacher explains parameters to be recorded, such as In Irwin Test: posture, locomotion, muscle tone, reflexes, pupil size, respiration, etc., and in FOB: sensory responses, neuromuscular function, autonomic signs, behavior changes, etc.
- Teacher leads discussion on categorizing observations into domains like autonomic function (e.g., salivation, piloerection), neuromuscular function (e.g., grip strength, gait), sensory responses (e.g., startle, tail pinch), CNS activity (e.g., alertness, sedation, convulsions), Students are encouraged to ask questions and clarify concepts.
- Teacher introduces the task for next session: preparing a format/table to assess clinical signs in animals.

Format Development & Presentation (2 hours)

- Students work in small groups to create a detailed observation format that includes categories of observations (e.g., autonomic, neuromuscular, behavioral), parameters to be recorded under each, scoring system or space for qualitative/quantitative notes, and time intervals or frequency of observation
- Each group briefly presents their format to the class (5–10 minutes each depending on number of groups). Class discusses strengths and possible improvements of each approach.
- Teacher reviews the different formats presented, highlights key parameters that must be included in any standard clinical observation battery, and discusses the application of these tests in regulatory toxicology and drug development.

Practical 5.3 : Protocol with four-point Bioassay method

Total duration: 2 hrs

- The teacher introduces the concept and objective of the session detailing Importance of bioassays in pharmacology, focus on the four-point bioassay method, an d Application to Unani drug screening

- Teacher explains the principle of the Four-Point Bioassay Used for quantitative estimation of a test substance by comparing it with a standard. involves two doses of standard and two doses of test preparation, based on log dose-response relationship includes calculation of potency using appropriate formula.

- The teacher walks through a demonstration or video examplifying Four-point bioassay using isolated tissue (e.g., guinea pig ileum or frog rectus abdominis) showing key steps of setting up the tissue bath, administering standard and test doses, recording response (e.g., contraction amplitude), and plotting dose-response curve.

- Students are divided into small groups (3–5 members), Each group is assigned or chooses a Unani drug to work with (e.g., anti-inflammatory, antispasmodic, bronchodilator). Under teacher guidance, each group works on designing a Four-Point Bioassay protocol by defining the objective, selecting an appropriate biological model (e.g., tissue or animal model), choose suitable standard drug for comparison, and determine two doses for both test and standard. Define response parameters (e.g., contraction, blood pressure, etc.), Include blinding, controls, and replication, draft data recording and analysis plan

- Each group presents their designed protocol to the class (approx. 8–10 mins each). They explain Drug and model chosen, Dose selection rationale, Response parameters and expected outcome, and Method of analysis.

- The teacher summarizes key principles of the four-point bioassay, highlights the strengths and weaknesses of each group's protocol, and Reinforces proper experimental design and interpretation, Discusses relevance to Unani pharmacology and research

Practical 5.4 : Organ bath system and its components

Total duration: 2 hrs

The teacher will demonstrate various components of the Organ bath system physically or with simulation or videos.

Practical 5.5 : Physiological salt solution praparation

Total duration: 2 hrs

Each student will be assigned a Physiological salt solution and asked to prepare the solution of the required concentration and maintain its pH.

Practical 5.6 : Dose-response curve of Acetylcholine using simulation software

Total duration: 2 hrs

The teacher will demonstrate the dose-response curve and determine the pD2 value of acetylcholine on the frog rectus abdominis muscle using simulation. Students will perform and practice the same on simulation software.

Practical 5.7 : Procedure of cell-based cytotoxicity assay

Total duration: 4 hrs

The teacher will demonstrate various steps of MTT assay using video, and presentation. Students will analyze and understand the principle and methodology for cytotoxicity testing for potential anti-cancer Unani formulations against cancer cell lines guided by the teacher.

The breakdown of the activity MTT assay practical may be as follows:

Demonstration & Conceptual Understanding (2 hours)

- The teacher presents the basic principle of MTT assay (e.g., reduction of MTT by mitochondrial enzymes in viable cells to form formazan), discuss its relevance in cytotoxicity testing, especially in evaluating anti-cancer activity.
- Teacher plays a video demonstrating the MTT assay procedure, including Cell seeding, Treatment with test formulations, Addition of MTT reagent, Incubation and color development, and Solubilization and absorbance reading
- Teacher elaborates on each step shown in the video using a detailed presentation. Focus on critical handling steps, control setups, and data interpretation. Students ask questions or clarify concepts and the teacher links assay steps to testing Unani formulations for anti-cancer potential.

- Teacher previews upcoming hands-on data analysis and interpretation of MTT results.

Application & Analysis (2 hours)

- Recap: cell lines used, concentrations of Unani formulations, and expected outcomes. Teacher provides hypothetical or actual absorbance data from MTT assays. Students calculate cell viability percentages and plot dose-response curves. Discuss IC_{50} determination and comparative cytotoxic effects.
- Students reflect on the assay's strengths and limitations.Teacher may introduce complementary assays (e.g., Trypan Blue, LDH assay), encourage students to think about future applications in Unani medicine research.

Experiential learning Activity

Experiential-Learning 5.1 : Overview of high-throughput screening.

Total duration:4 hrs

Students will review the literature available on High Throughput Screening (HTS) including video content and prepare an e-poster enumerating the process of HTS

Experiential-Learning 5.2 : Recent advances in Bioassay Techniques.

Total duration:4 hrs

The teacher will instruct the students to survey the literature for recent advances in bioassey techniques. Teacher will have a group discussion among students to discuss the recent advancement in bioassay techniques. Teacher will summarize the discussion and conclude it by recaping the discussion.

We can structure this activity on recent advances in bioassay techniquesas follows:

Literature Survey & Preparation (2 hours)

- Teacher introduces the concept of bioassays, emphasizing their role in pharmacology, toxicology, and drug discovery and brief overview of traditional vs. advanced techniques (e.g., cell-based assays, high-throughput screening, biosensors, organ-on-chip).
- Students (individually or in pairs) search for recent research articles or reviews (past 5–7 years) focusing on new or improved bioassay methods. Examples include Microfluidics-based assays, 3D cell culture assays, Reporter gene assays, High-content screening,and AI-integrated screening platforms. They take notes or prepare short summaries/highlights of key advancements.
- Students organize their findings for sharing in the next session — brief notes, bullet points, or slides (optional).

Group Discussion & Summary (2 hours)

- Teacher facilitates a structured round-table discussion where students share the technique they found, Its principle and application, advantages over traditional methods, limitations or challenges. He /she will encourage interaction and questions from peers to deepen understanding.
- Teacher recaps key points discussed by students, tying them together into a comprehensive summary, Highlights trends in bioassay development, relevance to drug testing, disease models, and personalized medicine, and future directions and implications.

Experiential-Learning 5.3 : Various types of Physiological salt solutions, their applications, and the role of different ingredients

Total duration: 4 hrs

Students will be divided into groups and each team will be assigned one physiological salt solution (PSS). The group will present the application of PSS, tissue preparation and bioassays in which a particular PSS is used.

Experiential-Learning 5.4 : Principle of physiograph and recording of tissue response

Total duration: 4 hrs

Students will collect the information on functioning and application of Physiograph system in pharmacological assays. Students will discuss and present in class various types of computerized data acquisition systems, software and transducers available for recording tissue response

Experiential-Learning 5.5 : Dose-response curve of Serotonin on isolated Rat stomach (fundus part) strip using simulation

Total duration: 2 hrs

The students will perform a dose-response curve of Serotonin on an isolated Rat stomach (fundus part) strip using simulation software. Students will perform and practice the same and record the data.

Experiential-Learning 5.6 : Refinement in animal research

Total duration:4 hrs

The students will be divided into groups and will be asked to prepare a short video or presentation highlighting various measures for refinement in laboratory animal research. They will present it in the class and the teacher will conclude and summarise the same,

The activity on refinement in laboratory animal researchcan be divided as follows:

Review & Content Creation (2 hours)

- Teacher introduces the 3Rs in animal research with a focus on Refinement like pain management, improved housing, enrichment, humane endpoints. Students are divided into small groups (3–5 members each).
- Each group picks or is assigned a specific refinement strategy, such as environmental enrichment, minimizing pain and distress, non-invasive techniques, improved surgical techniques or post-op care, use of humane endpoints, and groups brainstorm ideas for their video or presentation style.
- Groups gather content using textbooks, internet resources, or materials provided by the teacher. They create either A short video (2–5 minutes), OR A presentation (e.g., 5–7 slides), focus should be on clarity, creativity, scientific accuracy, and ethical reasoning.

Presentations & Discussion (2 hours)

- Each group presents their video or slides (5–7 minutes per group), peers and teacher can ask questions or provide short feedback after each.
- Open floor for discussion on which strategies seemed most impactful or feasible, how refinement aligns with both ethics and scientific quality, and challenges in implementing refinement measures in real-world labs.
- Teacher will recap the key refinement principles and practical examples from the student presentations, and emphasize the importance of ethical responsibility in animal-based research.

Experiential-Learning 5.7 : Various alternative methods for testing skin irritation and skin sensitization

Total duration:4 hrs

The teacher will instruct the students to collect information on various alternative methods for testing skin irritation and skin sensitization and their regulatory acceptance. A symposium may be organized and the team of students may present their observations and highlight various alternatives for skin irritation and skin sensitization, and also discuss regulatory acceptance of these models.

The structured breakdown of the activity is as follows:

Review & Preparation (2 hours)

- The teacher introduces the topic, explains objectives, and assigns students into small teams (or allows self-selection). Each team investigates alternative non-animal testing methods such as in vitro, in silico, or human-based models. Key areas to explore include How the method works, Scientific validation and efficacy, Current use in industry/research, Regulatory acceptance (e.g., OECD guidelines, FDA/EMA stance), and comparative analysis with traditional methods.
- Teams summarize their findings in preparation for presenting during the symposium. They may use slides, posters, or handouts.

BSymposium & Discussion (2 hours)

- Each team presents their findings (e.g., 10–15 minutes per group depending on number of teams). Presentations should include o erview of alternative method(s), Scientific basis and examples, Regulatory landscape, and Benefits and limitations
- Open floor for questions and discussion. The teacher may moderate with prompts like Which method seems most promising and why, What are the challenges in achieving wider regulatory acceptance, How could these alternatives impact research and industry.

Modular Assessment	
Assessment method	**Hour**

Instructions: Conduct a structured modular assessment. Assessment will be for 50 for this module. Keep structured marking patterns. Use different assessment methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the modular grade point as per Table 6C. 1. Practical: 30 Marks **30-mark assessment scheme** for the activity involving the **demonstration of the Organ Bath System**: **Observation Skills: 8** marks • Accuracy and clarity in noting the structure, components, and functioning of the organ bath system. **Practical Record Quality: 8** marks • Well-organized, neat, and complete documentation, including labeled diagrams (if applicable) and terminology used correctly. **Understanding of Components & Function: 6** marks • Ability to identify and explain the purpose of each component (e.g., tissue holder, levers, transducers, kymograph/sensor setup, etc.). **Participation and Engagement: 4** marks • Attentiveness during demonstration/video; asking relevant questions or making insightful observations. **Timely Submission & Presentation: 4** marks • Submission of practical record on time and following given format/instructions. 1. MCQs: 20 Marks Or Any practical in converted form can be taken for assessment. (25 marks) & Any of the experiential learning, such as portfolios, reflections, or presentations, can be taken as an assessment. (25 marks)	4

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 6 : علم السموم۔متعلقہ ضابطہ و قوانین اور ان کے مبادیات (Fundamentals of Regulatory Toxicology)						
Module Learning Objectives **(At the end of the module, the students should be able to)** 1. Describe the importance of ethical and regulatory requirements for toxicity studies 2. Discuss various regulatory guidelines for conducting toxicity studies 3. Demonstrate the practical skills required to conduct the preclinical toxicity studies.						
Unit 1 علم السموم۔متعلقہ ضابطہ و قوانین (Regulatory Toxicology) 6.1.1 Definition of Regulatory Toxicology 6.1.2 Significance of Regulatory Toxicity Studies 6.1.3 Classification of Regulatory Toxicity Studies **References:** 35,38,40						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 8	Describe the Regulatory Requirements for Unani Drugs and the Significance of Regulatory Toxicity Studies in Unani Medicine	1	Lecture	CC	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 8	Illustrate various types of regulatory toxicity studies	2	Experiential-Learning6.1	CAP	Shows-how	BS,DIS,PER

Unit 2 سمیات سے متعلق قوانین وضوابط (Regulatory Toxicity Guidelines)

6.2.1 Brief overview of OECD and ICH guidelines for toxicity testing

6.2.2 NDCT Rule-2019

6.2.3 OECD-Good Laboratory Practices

References: 20,35,38,39,40,41

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 8	Describe OECD Guidelines and principles of Good Laboratory Practices	2	Lecture	CAP	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 8	Demonstrate toxicity requirements of a study as per the New Drug and Clinical Trial (NDCT) Rule-2019	4	Practical6.1	CAP	Knows-how	BL,PER
CO 1,CO 3,CO 5,CO 8	Evaluate the scientific quality of the published toxicological studies on a drug	6	Experiential-Learning6.2	CAP	Knows-how	L&PPT ,L_VC,PER,TBL

Unit 3 نظامی مطالعات سمیت (Systemic toxicity studies)

6.3.1 Acute toxicity studies

6.3.2 Repeated Dose (28-days, 90-days, 180-days) toxicity studies

References: 35,38,40

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 8	Describe various systemic toxicity studies	2	Lecture	CAP	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 8	Appraise various types of acute systemic toxicity studies	6	Practical6.2	CAP	Knows-how	D,L&PPT ,L_VC,SIM

CO 1,CO 3,CO 5,CO 8	Prepare the protocol for acute or repeated dose toxicity studies	4	Experiential-Learning6.3	CAP	Knows-how	PAL,PER,PBL,PrBL

Unit 4 جینیاتی و سرطان زائی سمیت (Genotoxicity and Carcinogenicity)

6.4.1 Requirement and significance of genotoxicity testing

6.4.2 Various types of genotoxicity assays

6.4.3 Carcinogenicity studies

References: 35,38,40

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 8	Describe Genotoxicity and Carcinogenicity Testing Discuss the importance of Genotoxicity and Carcinogenicity Testing of Unani drugs	1	Lecture	CAP	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 8	Discuss the Relevant Guidelines and evaluation Methods for Genotoxicity Potential of Drugs	1	Lecture	CAP	Knows-how	L,L&GD,L&PPT ,L_VC,SDL
CO 1,CO 3,CO 5,CO 8	Appraise the guidelines for genotoxicity and Carcinogenicity studies	4	Experiential-Learning6.4	CAP	Knows-how	BL,DIS,PER
CO 1,CO 3,CO 5,CO 8	Analyze critically the carcinogencitiy studies.	2	Practical6.3	CAP	Knows-how	CBL,PBL,PrBL,SDL

Unit 5 سمیت دوران تولید وارتقاء جنین (Reproductive and Developmental Toxicity)

6.5.1 Requirement and Significance of Reproductive and Developmental Toxicity testing

6.5.2 Various types of Reproductive and Developmental Toxicity Tests

References: 20

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 8	Describe the significance of Reproductive and Developmental toxicity	1	Lecture	CAP	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 8	Develop protocol for Reproductive and Developmental Toxicity Testing of Unani Drugs	2	Experiential-Learning6.5	CAP	Knows-how	CBL,D,PER
CO 1,CO 3,CO 5,CO 8	Appraise the Relevant Guidelines for Reproductive and Developmental Toxicity	2	Experiential-Learning6.6	CAP	Shows-how	CBL,PER,PrBL

Unit 6 جلد کی حساسیت اور مقامی سمیت (Local Toxicity and Skin Sensitization)

6.6.1 Dermal Irritation

6.6.2 Eye Irritation

6.6.3 Skin Sensitization

References: 20,35,38,40

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 3,CO 5,CO 8	Describe Local Toxicity and Skin Sensitization,	1	Lecture	CAP	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 8	Discuss the importance of Local Toxicity Testing and Skin Sensitization Potential	1	Lecture	CAP	Knows-how	L,L&GD,L&PPT ,L_VC
CO 1,CO 3,CO 5,CO 8	Appraise the Relevant Guidelines and Evaluation method for Local Toxicity Testing and Skin Sensitization	4	Experiential-Learning6.7	CAP	Shows-how	D,L&PPT ,L_VC,SIM
CO 1,CO 3,CO 5,CO 8	Demonstrate Methods for Skin Sensitization following related guidelines	4	Practical6.4	PSY-GUD	Shows-how	D,L&PPT ,L_VC,SIM

CO 1,CO 3,CO 5,CO 8	Communicate findings of local toxicity testing studies	2	Experiential-Learning6.8	CAP	Knows-how	JC,PBL
CO 1,CO 3,CO 5,CO 8	Demonstrate method for acute dermal irritation test	4	Practical6.5	CAP	Knows-how	D,L&PPT ,L_VC

Practical Training Activity

Practical 6.1 : The toxicity requirements as per New Drug and Clinical Trial (NDCT) Rule-2019

Total duration: 4 hrs

The teacher will demonstrate various toxicity requirements as mentioned in NDCT ruyle 2019 through a flow diagram.. Students will study the NDCT rules-2019 and will prepare an e-poster on the toxicity requirements given in the rules.

The breakdown of the practical session with a clear structure is as follows:

Teacher's Demonstration and Overview (2 Hours)

1. The teacher introduces the NDCT Rules 2019 and their significance in toxicity testing for new drugs and formulations with key topics of toxicity study requirements, regulatory guidelines, safety testing, and ethical considerations.
2. The teacher presents a flow diagram illustrating the various toxicity requirements specified in the NDCT Rules 2019. The flow diagram will cover types of toxicity studies required (acute, sub-chronic, chronic, carcinogenicity, etc.), test species and dosages, duration and parameters to be observed,regulatory requirements for safety and ethical compliance, and teacher explains how each element of the flow diagram fits into the overall toxicity testing process.
3. Students can ask questions to clarify any doubts about the NDCT Rules and the flow diagram. Teacher offers further insights and examples of real-world applications

E-Poster Preparation and Submission (2 Hours)

1. Students will read and review the NDCT Rules 2019 in detail, focusing specifically on the toxicity testing requirements. Students should take notes on key points that they would include in their e-poster.
2. Using the information from the rules and teacher's demonstration, each student will prepare an e-poster summarizing the toxicity requirements as outlined in the NDCT Rules 2019. The e-poster should include title and clear overview of toxicity testing requirements, a breakdown of different types of toxicity studies and their purpose, visual elements (flow diagram, tables, or charts) to highlight key points, relevant guidelines and regulations, Teacher assist students, offering feedback on poster design and content.
3. Students submit their completed e-posters. Teacher provides final feedback on the posters and gives suggestions for improvement if necessary.

Practical 6.2 : Acute toxicity study using simulation/video

Total duration: 6 hrs

The teacher will demonstrate the AOT425 software for acute toxicity studies or repeated dose toxicity studies with the help of video / published articles. The students will carefully observe the same. They will repeat the practical themselves in presence of the teacher. They will write the observations and submit it as practical records.

Introduction and Demonstration (2 hours)

- The teacher introduces AOT425 software and its applications in acute toxicity or repeated dose toxicity studies, demonstrates the software using video tutorials or published articles, and explains key features, steps involved, and expected outcomes.
- The students will actively observe, take notes, and ask questions for clarification.

Hands-on Practice (2 hours)

- Students individually repeat the practical exercise using the AOT425 software under teacher supervision and the teacher provides guidance and troubleshooting as needed.
- The students practice the software workflow independently and Clarify doubts and gain confidence in software usage.

Documentation and Submission (2 hours)

- Students write their observations, results, and interpretations in their practical records. the teacher assists with report formatting and accuracy if required. Submit the completed practical record for evaluation.

Practical 6.3 : Analysis of the published reports on carcinogenicity

Total duration: 2 hrs

The teacher will instruct the student to survey published report of marketed products / consumer products / herbal drugs for carcinogenicity. They will be asked to collect and literature about the same. The teacher will demonstrate the analytical approach for carcinogenicity of one product. The students will share their collected information and prepare the anlytical report for other collected substances. The students will note their observations and submit it to the teacher as practical record.

Practical 6.4 : Skin sensitization test

Total duration:4 hrs

The teacher will Demonstrate of skin sensitization test using simulation software or video to the students in the laboratory. The students will then practice from the software the same and note the observations. They will present their observations as practical records.

Demonstration & Guided Practice: 2 hours

- The teacher gives a Brief explanation of the objective, importance, and ethical context and overview of the simulation software/video tool to be used.
- The teacher gives step-by-step demonstration using the simulation software or an educational video, highlight key steps, parameters to observe, and how to record data.
- Students use the simulation software to replicate the demonstrated procedure. Teacher circulates to assist, clarify doubts, and ensure students are on track.

Independent Practice & Record Submission: 2 hours

- Students repeat the simulation independently. Each student conducts at least one full run and records detailed observations, focus on variations, results, and data interpretation.
- Students compile their observations into structured practical records. Submit it to the teacher.

Practical 6.5 : Acute dermal irritation test

Total duration: 4 hrs

The teacher will demonstrate of acute dermal irritation test using simulation software or video. The teacher will instruct students to record the observations and along with it outline and enlist various guidelines and evaluation methods for assessment of dermal irritation.

The structured way to divide this practical activity on Acute Dermal Irritation Test is as follows:

Demonstration & Concept Introduction (2 hours)

- Teacher introduces the purpose of the test in toxicology.Discusses ethical considerations and use of alternatives (e.g., in vitro/in silico models).
- Teacher plays a step-by-step simulation or recorded video of the test procedure. Key steps include animal selection and preparation, application of test substance, observation and scoring of skin reactions (erythema, edema).
- Students observe the simulated test and record observations using a provided format. Teacher explains how to score reactions based on Draize scoring system or equivalent.
- Brief class discussion of the recorded data. Teacher clarifies how the severity of dermal responses is evaluated.

Guidelines & Evaluation Methods (2 hours)

- Teacher introduces OECD Test Guideline 404 (Acute Dermal Irritation/Corrosion) and provides brief overview of alternative methods like OECD TG 439 (in vitro skin irritation), and OECD TG 431/430 (corrosion testing). The teacher leads discussion of GLP compliance and ethical protocols.
- Students work in small groups to outline key points from guidelines, list and explain the evaluation parameters (e.g., scoring scale, exposure duration, observation period), and summarize data interpretation and classification (e.g., GHS classification of skin irritation).
- Each group briefly shares their outline. Teacher provides feedback and summarizes the activity. Recap key learning points.

Experiential learning Activity

Experiential-Learning 6.1 : Requirement of regulatory toxicity for new drug approval

Total duration: 2 hrs

Students will be divided into groups, each group will study the requirement of regulatory toxicity for new drug approval for one domain of toxicity as required for CDSCO and ICH. The student will prepare a chart on the same and submit it to the teacher.

Experiential-Learning 6.2 : Evaluation of toxicity studies

Total duration: 6 hrs

The teacher will demonstrate one published toxicity study on a drug. Then each student will have to select one scientific article concerning toxicity study as per any relevant guidelines and present the critical appraisal of the same in the form of a PPT. The teacher will assess the PPT with a pre formatted checklist and recap and summarise the PPts.

The organised breakdown of the activity into is as follows:

Demonstration of a Published Toxicity Study (2 Hours)

1. The Teacher will give brief introduction to toxicity studies: significance, types, and guidelines, and Overview of the methodology for critiquing toxicity studies.
2. The teacher presents and discusses one published toxicity study on a drug with key focus on the study's design, methodology, results, and conclusions. Teacher explains how to critically appraise a toxicity study using appropriate guidelines like design, animal models, doses, statistical analysis, ethical considerations, and regulatory compliance. Students can ask questions for clarification or deeper understanding of the demonstration

Student Review and PPT Creation (2 Hours)

1. Each student selects one scientific article on toxicity studies that follows any relevant guidelines (e.g., OECD, ICH, FDA, or EMA). Students search for articles based on their areas of interest or assigned topics

2. Students read and critically appraise the chosen article, focusing on the methodology, results, and discussion sections. Develop a PPT presentation to highlight the key points of the article like study design, dose, animals, and toxicity endpoints, strengths and limitations of the study, relevance and applicability of the findings, and use a structured format for clarity and consistency in their presentations

PPT Presentation, Assessment, and Recap (2 Hours)

1. Students present their critical appraisal PPTs to the class (5–10 minutes per student). Teacher provides immediate feedback on each presentation based on a pre-formatted checklist (focus on clarity, content quality, critical thinking, and adherence to guidelines)
2. The teacher reviews and summarizes the key insights from each student's presentation, gives final feedback and tips for improving future critical appraisal

Experiential-Learning 6.3 : Protocol for acute or repeated dose toxicity for given unani formulation

Total duration:4 hrs

The teacher will demonstrate the preparation of protocol for acute or repeated dose toxicity for a formulation. Students will be given a unani formulation each and they will develop the protocol for acute or repeated dose toxicity studies under the guidance of the teacher and submit the same as practical records.

To structure this activity into a structured format as follows:

Demonstration and Planning (2 Hours)

- The teacher will explain and demonstrate how to prepare a protocol for acute or repeated dose toxicity studies, focusing on a formulation-based approach. Key components covered may include objective and study design, animal model selection, dose selection and administration route, observation parameters, and ethical considerations and regulatory compliance.
- Each student is assigned a unique Unani formulation. Students begin developing their protocol under the teacher's guidance. Teacher provides feedback and helps clarify any part of the protocol structure.

Protocol Finalization and Submission (2 Hours)

- Students continue working on their respective protocols. Teacher circulates to assist and provide one-on-one feedback
- Students complete and submit their protocols as part of practical records. Teacher provides concluding remarks, emphasizing the importance of well-designed toxicity studies in evaluating Unani formulations

Experiential-Learning 6.4 : Guidelines for genotoxicity and carcinogenicity studies

Total duration: 4 hrs

The teacher will provide the the relevant guidelines related to genotoxic and carcinogenic studies to the students. The students will read the guidelines and then will be divided in two groups. A quiz on the genotoxicity and carcinogenicity will be organized between the students. The teacher will provide the final inputs and conclude the quiz session.

The breakdown of the activity is as follows:

Understanding the Guidelines (2 hours)

- The Teacher will brief overview of genotoxicity and carcinogenicity and explain the importance of the guidelines in toxicology studies.
- Students read and review the provided guidelines individually or in small pairs and teacher is available to clarify any doubts
- Students are divided into two groups, Each group discusses key points from the guidelines to prepare for the quiz

Quiz and Wrap-Up (2 hours)

- Quiz is conducted between the two student groups, It could include MCQs, short answers, and scenario-based questions.
- Teacher discusses the quiz questions and answers, provides additional insights and clarifies complex topics, and summarizes the session and highlights key takeaways.

Experiential-Learning 6.5 : Protocol for reproductive and developmental toxicity

Total duration: 2 hrs.

Students will be given one product and will have to develop a protocol for reproductive and developmental toxicity of the given products as per relevant guidelines. The teacher will guide the students to write the protocol as an assignment and submit it to the teacher

Experiential-Learning 6.6 : The sientific profile of substances for reproductive or developmental toxicity

Total duration: 2 hrs

The teacher will instruct the students to visit the library and surf the internet prepare a scientific profile of 3-5 substances that are reported for reproductive or developmental toxicity. The profile will be compiled by the students and submit it to the teacher as a written assignment.

Experiential-Learning 6.7 : Skin irritation test

Total duration: 4 hrs

The teacher will instruct the students to visit library and surf internet for the information regarding methods of local toxicity testing and skin sensitisation. They will also survey the relevant guidelines for local toxicity testing and skin sensitization. TThey are asked to organise the information in the form of written assignment and submit it to the teacher for assessment and further guidance

Experiential-Learning 6.8 : Presentation of a published local toxicity study

Total duration: 2 hrs

Each Student will be instructed to select one high-quality quality publication on local toxicity and present & discuss the findings in the classroom as a journal presentation. The teacher will assess the journal club presentations on pre-formatted checklist and then discuss the same with the students.

Modular Assessment

Assessment method	**Hour**
Instructions: Conduct a structured modular assessment. Assessment will be for 50 for this module. Keep structured marking patterns. Use different assessment methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the modular grade point as per Table 6C. 1. **Presentation: 20 marks** The 20-mark assessment plan for the presentation, including desktop research, scientific profiling, and presentation submission, is as follows: **Quality of Research: 5** marks - Use of credible and relevant sources - Depth and accuracy of information **Scientific Content: 5** marks - Clear description of each substance - Evidence of reproductive/developmental toxicity - Mechanism of action (if known) **Organization and Structure: 3** marks - Logical flow and clarity of the presentation - Proper categorization and comparison **Visual Presentation: 3** marks	4

- Use of visuals/tables/graphs where applicable - Aesthetic and readable design **Referencing and Citations : 2** marks - Proper citation of all data sources (APA/MLA/other accepted style) **Originality and Effort: 2** marks - Demonstrated understanding and originality of content - Effort and depth in analysis and **2. Experiential Learning: 30 Marks** Or Any practical in converted form can be taken for assessment. (25 marks) & Any of the experiential learning, such as portfolios, reflections, or presentations, can be taken as an assessment. (25 marks)	

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 7 : زندہ حیات میں ادویاتی افعال وخواص کے چھان بین کے طریقے (In-vivo Methods of Drug Screening)						
Module Learning Objectives **(At the end of the module, the students should be able to)** • Describe the various screening methods for the evaluation of Unani drugs. • Conduct various experiments on laboratory animals to validate the action of Unani drugs. • Identify the most suitable animal models for the screening of Unani drugs. • Demonstrate the working principles of the instruments used in animal experiments. • Conduct the experiments by using simulated software.						
Unit 1 حیوانات میں مواد ادویہ کے دافع الم، دافع حمیٰ اور محلل ورم پر جانچ پڑتال (Animal Models for Evaluating Analgesic, Antipyretic, Anti-inflammatory Activity) 7.1.1 Analgesic Activity 7.1.1.1 Eddy's hot plate method, 7.1.1.2 Tail flick method 7.1.1.3 Tail immersion method 7.1.1.4 Tail clip test 7.1.1.5 Writhing test 7.1.2 Antipyretic Activity						

7.1.2.1 Yeast-induced pyrexia

7.1.2.2 Lipopolysaccharide-induced pyrexia

7.1.3 Anti-inflammatory activity

7.1.3.1 Carrageenan-induced rat paw edema test

7.1.3.2 Cotton pellet implantation test

7.1.3.3 Freund's adjuvant-induced arthritis test

References: 14,15,16,17,18,19,20,21,22,23,34,35,36,37

3A	3B	3C	3D	3E	3F	3G
CO 5	Discuss the screening methods for analgesic, anti-inflammatory and antipyretic activity	2	Lecture	CK	Knows-how	L&PPT ,L_VC
CO 5	Demonstrate the working principle of Eddy's hot plate test.	1	Practical7.1	PSY-GUD	Shows-how	D,PT
CO 5	Explain the working principle of the Tail flick response apparatus.	1	Practical7.2	PSY-GUD	Shows-how	D,PT
CO 5	Determine the analgesic activity of morphine using simulation software by analgesiometer in mice.	2	Experiential-Learning7.1	PSY-GUD	Shows-how	SIM
CO 5	Evaluate the analgesic activity of morphine using simulation software by hot plate method in mice.	2	Experiential-Learning7.2	PSY-GUD	Shows-how	SIM
CO 5	Analyze the analgesic activity of aspirin using simulation software by acetic acid-induced writhing test in mice.	3	Experiential-Learning7.3	PSY-GUD	Shows-how	SIM
CO 5	Demonstrate the various types of thermoprobe/thermometers used to record temperature in small laboratory animals.	1	Practical7.3	PSY-GUD	Shows-how	D
CO 5	Demonstrate the working principle of the Digital Plethysmometer.	1	Practical7.4	PSY-GUD	Shows-how	D,PT

CO 5	Determine the anti-inflammatory activity of aspirin/indomethacin using simulation software by Plethysmometer in rats.	2	Experiential-Learning7.4	PSY-GUD	Shows-how	SIM

Unit 2 حیوانات میں مواد ادویہ کے دافع قرحہ عمل پر جانچ پڑتال (Animal Models for Evaluation of Anti-ulcer Activity)

7.2.1 Induction of gastric ulcer by ulcerogenic agent

7.2.2 Stress-induced gastric ulcer

References: 14,15,16,17,18,19,20,21,22,23,35,36,37

3A	3B	3C	3D	3E	3F	3G
CO 5	Discuss various screening techniques for antiulcer activity.	1	Lecture	CAP	Knows-how	L&PPT
CO 5	Choose the most suitable animal model to screen Unani drugs for anti-ulcer activity.	1	Practical7.5	CE	Knows-how	DIS,LS
CO 5	Demonstrate various restraint methods to induce gastric ulcer in rats.	1	Practical7.6	PSY-GUD	Shows-how	D
CO 5	Tabulate the ulcerogenic agents with dose, route, and duration.	1	Practical7.7	PSY-GUD	Knows-how	D
CO 5	Determine the antiulcer activity of a drug in rats using simulated software by pylorus ligation method.	2	Experiential-Learning7.5	PSY-GUD	Shows-how	SIM

Unit 3 حیوانات میں مواد ادویہ کے قلب و دوران خون پر اثر پذیری کی جانچ پڑتال (Animal Models for Evaluation of the Effect of Drugs on the Cardiovascular System)

7.3.1 Isoproterenol-induced myocardial infarction

7.3.2 DOCA-salt-induced Hypertension

References: 15,16,17,18,19,20,21,22,23,34,35,36,37

3A	3B	3C	3D	3E	3F	3G
CO 5	Discuss the animal models used for the screening of cardiovascular drugs.	1	Lecture	CAP	Knows-how	DIS

CO 5	Enlist the models used to screen anti-hypertensive drugs.	1	Practical7.8	PSY-GUD	Shows-how	D
CO 5	Screening of the cardiovascular drugs using simulated software by Lagendorff apparatus.	1	Experiential-Learning7.6	PSY-GUD	Shows-how	SIM

Unit 4 حیوانات میں مواد ادویہ کے محافظ کبد تعمل کی جانچ پڑتال (Hepatoprotective Activity)

7.4.1 Animal Models for Evaluation of Hepatoprotective Activity by Various Hepatotoxicants

References: 20,34,35

3A	3B	3C	3D	3E	3F	3G
CO 5	Discuss hepatocellular injury test.	1	Lecture	CAP	Knows-how	DIS,L&PPT
CO 5	Illustrate the Hepatotoxic agents with dose, route, and duration.	1	Practical7.9	PSY-GUD	Knows-how	D,PAL,PER
CO 5	Evaluate the animal models used to screen hepatoprotective drugs.	2	Experiential-Learning7.7	CC	Knows-how	BS,DIS,LS

Unit 5 حیوانات میں مواد ادویہ کے محافظ کلیہ تعمل کی جانچ پڑتال(Animal Models for Evaluation of Nephroprotective Activity)

7.5.1 Cisplatin-induced nephrotoxicity,

7.5.2 Adriamycin-induced nephrotoxicity

References: 14,15,16,17,18,19,20,21,22,23,34,35,36,37

3A	3B	3C	3D	3E	3F	3G
CO 5	Discuss Cisplatin and Adriamycin induced nephrotoxicity.	1	Lecture	CAP	Knows-how	DIS
CO 5	Illustrate nephrotoxic agents with dose, route, and duration.	1	Practical7.10	CAN	Shows-how	D
CO 5	Evaluate the animal models used to screen nephroprotective drugs.	1	Experiential-Learning7.8	CAN	Knows-how	BS,DIS,LS

Unit 6 حیوانات میں مواد ادویہ کے دافع ذیابیطس عمل کی جانچ پڑتال (Animal Models for Evaluation of Hypoglycaemic Activity)

7.6.1 Streptozotocin and alloxan-induced diabetes

7.6.2 High fat diet and low dose induced streptozotocin-induced model

References:

3A	3B	3C	3D	3E	3F	3G
CO 5	Explain the animal models used to screen the antidiabetic drugs.	1	Lecture	CAP	Knows-how	L&PPT
CO 5	Illustrate the diabetogenic agents with dose, route, and duration.	1	Practical7.11	CK	Knows-how	D
CO 5	Analyse the streptozotocin and alloxan induced diabetes animal model.	1	Experiential-Learning7.9	CE	Knows-how	BS

Unit 7 حیوانات میں مواد ادویہ کے قاطع عم الدم عمل کی جانچ پڑتال (Animal Models for Evaluation of Hypolipidemic Activity)

7.7.1 High-fat diet-induced hyperlipidemia

7.7.2 Fructose induced dyslipidemia

References: 14,15,16,17,18,19,20,21,22,23,34,35,36,37

3A	3B	3C	3D	3E	3F	3G
CO 5	Explain Triton-induced hyperlipidemia and Fructose-induced hypertriglyceridemia in rats.	1	Lecture	CAP	Knows-how	L&PPT
CO 5	Determine the blood glucose level in animals by simulated software.	1	Practical7.12	PSY-GUD	Shows-how	PT,SIM
CO 5	Formulate a high-fat diet.	1	Experiential-Learning7.10	PSY-GUD	Shows-how	BL

Unit 8 حیوانات میں مواد ادویہ کے دافع اضطراب، دافع وحشت، دافع سنج، مخدر اور منوم عمل کی جانچ پڑتال (Animal Models for Evaluation of Anti-anxiety, Anti-depressant, Anticonvulsant, Sedative and Hypnotic Activity)

7.8.1 Elevated plus maze test

7.8.2 Light-dark exploration test

7.8.3 Despair swim test

7.8.4 Tail suspension test

7.8.5 Maximal Electro Shock induced convulsion test

7.8.6 Pentylenetetrazolinduced convulsion test

7.8.7 Righting reflex test

7.8.8 Pentobarbitone narcosis potentiation test

7.8.9 Spontaneous motor activity

References: 18,20,34,35

3A	3B	3C	3D	3E	3F	3G
CO 5	Describe the procedure and evaluation parameters to assess the efficacy of an anti-anxiety, anti depressant, anticonvulsant, sedative and hypnotic drugs.	1	Lecture	CAP	Knows-how	L&PPT
CO 5	Demonstrate the working principle of the instruments used to screen anti-anxiety drugs.	1	Practical7.13	PSY-GUD	Shows-how	D,PT
CO 5	Determine the anti-anxiety activity of a drug using simulated software by Elevated plus maze test.	1	Experiential-Learning7.11	PSY-GUD	Shows-how	SIM
CO 5	Enlist the animal models used to screen for anti-depressant activity.	1	Practical7.14	CAP	Knows-how	D
CO 5	Illustrate the parameters to evaluate the efficacy of anti-depressant drugs.	1	Practical7.15	PSY-GUD	Knows-how	D
CO 5	Demonstrate the Electro convulsometer and its working principle.	1	Practical7.16	PSY-GUD	Shows-how	D,PT

CO 5	Determine the anticonvulsant activity of phenytoin using simulated software by the Electroconvulsometer.	1	Experiential-Learning7.12	PSY-GUD	Shows-how	SIM
CO 5	Determine the anticonvulsant activity of a drug using simulated software by the Pentylene tetrazole seizure test.	2	Experiential-Learning7.13	PSY-GUD	Shows-how	SIM
CO 5	Illustrate the evaluation parameters to test the efficacy of anti-epileptic drugs.	1	Practical7.17	PSY-GUD	Knows-how	D
CO 5	Determine the pentobarbitone-induced hypnosis in mice by using simulated software.	2	Experiential-Learning7.14	PSY-GUD	Shows-how	SIM
CO 5	Determine the sedative effect of a drug using Cook's pole Climbing apparatus.	1	Experiential-Learning7.15	PSY-GUD	Shows-how	SIM
CO 5	Determine the muscle relaxant activity of a drug using simulated software with the help of a Rota Rod Apparatus.	1	Experiential-Learning7.16	PSY-GUD	Shows-how	SIM
CO 5	Determine the effects of chlorpromazine on locomotor activity using simulated software by a photoactometer in rats	1	Practical7.18	PSY-GUD	Shows-how	PT,SIM

Unit 9 حیوانات میں مواد ادویہ کے قوی نفسانیہ پر اثر پذیری کی جانچ پڑتال (Animal Models for Evaluation of Effect of Drug on Cognitive Function)

7.9.1 Passive Avoidance Test

7.9.2 Morris Water Maze Test

References: 14,15,16,17,18,19,20,21,22,23,34,35,36,37

3A	3B	3C	3D	3E	3F	3G
CO 5	Describe the animal models used to screen the drugs for cognitive function.	1	Lecture	CAP	Knows-how	L&PPT
CO 5	Demonstrate Step-through and step down test	1	Practical7.19	PSY-GUD	Shows-how	D
CO 5	Explore the memory-improving effect of a drug using simulated software with the help of Elevated plus maze.	1	Experiential-Learning7.17	PSY-GUD	Shows-how	SIM
CO 5	Demonstrate Morris Water Maze Test.	1	Practical7.20	PSY-GUD	Shows-how	D

Practical Training Activity
Practical 7.1 : Demonstration of the working principle of Eddy's hot plate test.
Total duration: 1 hrs Students will learn about Eddy's hot plate and will then demonstrate its working principle.
Practical 7.2 : Demonstration of the working principle of the Tail flick response apparatus.
Total duration: 1 hrs Students will be acquainted with the analgesiometer and will then demonstrate its working principle.
Practical 7.3 : Thermoprobe/thermometers used to record temperature in small laboratory animals
Total Duration: 1 hrs Students will make a list of all types of thermoprobes used in recording temperature in small laboratory animals and demonstrate them to the class.
Practical 7.4 : Demonstration of the Digital Plethysmometer.
Total duration: 1 hrs Students will study the Digital Plethysmometer and demonstrate the working principle.
Practical 7.5 : Selection of the most suitable animal model to screen Unani drugs for anti-ulcer activity.
Total duration: 1hrs The teacher will give an assignment to the students to make a list of animal models used to screen antiulcer drugs. Students will explore the journals and books, discuss with scientists working in the field, and select the most suitable model for the screening of Unani anti-ulcer drugs.
Practical 7.6 : Restraint ulcer in rat
Total duration: 1 hrs The teacher will instruct students to identify the various restraint methods used to induce gastric ulcers in rats and explain the methods in simple words.
Practical 7.7 : Ulcerogenic agents
Total duration: 1 hrs

Students will prepare a poster of commonly used ulcerogenic agents with their dose, route, and duration. The posters will then be presented in the class.
Practical 7.8 : Poster presentation
Total duration: 1 hrs Students will prepare a chart including all the anti-hypertensive animal models with their merits and demerits.
Practical 7.9 : Poster presentation
Total duration: 1 hrs Students will prepare a poster of commonly used hepatotoxic agents with details of dose, route, and duration. The posters will then be presented in the class.
Practical 7.10 : Making Chart
Total duration: 1 hrs Students will create a poster depicting commonly used nephrotoxic drugs, including dose, route, and duration. The posters will then be presented in class.
Practical 7.11 : Chart preparation on diabetogenic agents.
Total duration: 1 hrs Students will prepare a chart of commonly used diabetogenic agents with their dose, route, and duration and present the same in class.
Practical 7.12 : Simulation experiment
Total duration: 1 hrs The teacher will give an overview of the simulation software to the students. They will then follow the instructions generated by the software to determine the blood glucose level in animals.
Practical 7.13 : Demonstration on instrument
Total duration: 1 hrs The teacher will instruct students to demonstrate the working principle of Condition avoidance response test.
Practical 7.14 : Chart preparation for animal models used in anti-depressant activity,
Total hours:1

Students will be instructed to prepare a chart for all animal models for anti-depressant activity with their purpose and rationale. Submit the same to the teacher as a practical record.
Practical 7.15 : Assessment parameters for antidepressant activity.
Total duration: 1 Students will be required to make a chart on assessment parameters to evaluate the effect of antidepressant drugs and then explain it to the teacher.
Practical 7.16 : Demonstration of instrument, Electroconvulsometer.
Total duration: 1 hrs The teacher will demonstrate various parts of the electroconvulsometer and their uses. He will demonstrate the working principles of the instrument. The students will write the principles and the use and submit it as a practical record to the teacher.
Practical 7.17 : Demonstration on antiepileptic activity
Total duration: 1 hrs Students will draw up a chart on assessment parameters to evaluate the effect of antiepileptic drugs and present it before the teacher.
Practical 7.18 : In vivo experiment on simulated software
Total duration:1 hrs The teacher will demonstrate to the students how to go through the simulated software and follow the on-screen instructions to evaluate the locomotor activity of rats by using the simulated software. The students will note the observations and submit them to the teacher as the practical record.
Practical 7.19 : Demonstration on cognition test
Total duration: 1 hrs The teacher will demonstrate the method of Step-through and Step-down tests. Students will explain to the teacher what they have learned.
Practical 7.20 : Morris Water Maze Test
Total duration: 1 hrs The teacher will demonstrate the method of the Morris Water Maze Test in the laboratory.
Experiential learning Activity

Experiential-Learning 7.1 : Determination of analgesic activity of morphine using simulation software by analgesiometer in mice.

Total duration: 2 hrs

Teacher will instruct each student to go through the simulated software and follow the instructions as shown in the software and evaluate the analgesic activity of morphine in mice by analgesiometer.

Experiential-Learning 7.2 : Determination of analgesic activity of morphine using simulation software by hot plate method in mice.

Total duration: 2 hrs

The educator will give an overview of the simulation software to the students. They will then follow the instructions generated by the software to evaluate the analgesic activity of morphine in mice by hot plate method.

Experiential-Learning 7.3 : Analgesic activity of aspirin using simulation software by acetic acid-induced writhing test

Total Hours: 3

Each student will run the simulation software, follow the instructions, and test the analgesic effect of aspirin in mice using acetic acid-induced writhing.

To divide the 3-hour activity for students to test the analgesic effect of aspirin using the acetic acid-induced writhing method in a mouse simulation following may be done:

Setup and Data Collection: 1.5 hours

Objectives:

- Familiarize students with the simulation software.
- The teacher will give an overview of the writing test,an and explanation of simulation objectives, and software use, discuss control and treatment groups, and dosage of aspirin and administration method.
- Each student runs the simulation, administers acetic acid and aspirin (or placebo), and observes and records the number of writhes in mice. and ensure save/export of their data.

Analysis and Discussion: 1.5 hours

- Students will calculate means and standard deviations, perform a t-test or ANOVA (can be done manually or using software like SPSS/Excel), determine the efficacy of aspirin, compare results across groups, and discuss the limitations of the method and simulation.
- Teacher will summarize key learning points nd address any questions.

Experiential-Learning 7.4 : Anti-inflammatory activity on simulation software by Plethysmometer.
Total duration: 2 hrs The educator will give an overview of the simulation software to the students. They will then follow the instructions generated by the software to determine the anti-inflammatory activity of aspirin in rats by plethysmometer.
Experiential-Learning 7.5 : Antiulcer activity using simulated software.
Total duration: 2 hrs The teacher will give an overview of the simulation software to the students. They will then follow the instructions generated by the software to determine the anti-ulcer activity of a drug in rats by the Pylorus ligation method.
Experiential-Learning 7.6 : Ex vivo experiment
Total duration: 1 hrs The educator will give an overview of the simulation software to the students. They will then follow the instructions generated by the software to evaluate the cardiovascular drug on rat hearts by using simulated software of Lagendorffs apparatus.
Experiential-Learning 7.7 : Evaluation of hepatoprotective animal models.
Total duration: 2 hrs The teacher will assign a task to the students to make a list of animal models used to screen hepatoprotective drugs. Students will refer to journals, and books, and engage in discussions with scientists working in the field to select the most suitable model for the screening of Unani hepatoprotective drugs.
Experiential-Learning 7.8 : Brain storming session on selection of animal models for nephroprotective activity
Total duration: 1 hrs The teacher will assign a task to the students to make a list of animal models used to screen nephroprotective drugs. Students will refer to journals, and books, and engage in discussions with scientists working in the field to select the most suitable model for the screening of Unani nephroprotective drugs.
Experiential-Learning 7.9 : Analysis of the streptozotocin and alloxan induced diabetes animal model.
Total duration: 1 hrs

The teacher will divide the students into two groups: one will seek the alloxan-induced diabetes model, while the other will study streptozotocin-induced diabetes. After collecting the data, both groups will analyze and present it to the class. In this approach, they may gain critical abilities and be able to determine which drug is most commonly used for diabetes induction and why.
Experiential-Learning 7.10 : High fat diet formulation
Total duration: 1 hrs Students will survey for the composition of a high-fat diet used to induce hyperlipidemia in rats. They will then write the stepwise preparation of fatty diet formulation for rats for inducing hyperlipideamia.
Experiential-Learning 7.11 : Elevated plus maze test
Total duration: 1 hrs The educator will give an overview of the simulation software to the students. They will then follow the instructions generated by the software to evaluate the antianxiety activity of a drug in rats by Elevated plus maze test.
Experiential-Learning 7.12 : Anti convulsant activity on simulated software.
Total Hours: 1 The teacher will give an overview of the simulation software to the students. They will then follow the instructions generated by the software to evaluate the anti-convulsant activity of phenytoin in rats by Electroconvulsometer.
Experiential-Learning 7.13 : Pentylene tetrazole seizure test by simulated software.
Total duration: 2 The educator will give an overview of the simulation software to the students. They will then follow the instructions generated by the software to evaluate the anti-convulsant activity of a drug in rats by Pentylene tetrazole seizure test.
Experiential-Learning 7.14 : In vivo experiment on simulated software.
Total duration: 2 hrs The educator will give an overview of the simulation software to the students. They will next follow the software's instructions to assess pentobarbitone-induced hypnosis in mice.
Experiential-Learning 7.15 : Screening of CNS drugs on simulated software

Total duration:1 hrs

The teacher will give an overview of the simulation software to the students. They will then follow the instructions generated by the software to determine the sedative activity of a drug using Cook's pole Climbing apparatus.

Experiential-Learning 7.16 : Muscle relaxant activity on simulated software.

Total duration:1 hrs

The teacher will give an overview of the simulation software to the students. They will then follow the instructions generated by the software to determine the muscle relaxant activity of a drug in rats by Rota rod apparatus.

Experiential-Learning 7.17 : In vivo experiment on simulated software.

Total duration: 1 hrs

The teacher will give an overview of the simulation software to the students. They will then follow the instructions generated by the software to evaluate the memory-improving effect of a drug in rats by Elevated Plus Maze. The students will note the procedure and the parameters in the record book and submit it to the teacher.

Modular Assessment

Assessment method	**Hour**
Instructions: Conduct a structured modular assessment. Assessment will be for 50 for this module. Keep structured marking patterns. Use different assessment methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the modular grade point as per Table 6C. 1. **Practical: 30 Marks** Each student must explain the working principles of any two instruments (Hot plate analgesiometer/Digital Plethysmometer/Electroconvulsometer/Rota rod apparatus/ photoactometer. The evaluation will be based on the understanding and method of describing the corresponding instruments. 2. **Experiential Learning: 20 Marks** Evaluation of summary reports of experiments on simulated software or demonstrated instruments and real-time experience on animal experimentation with the seniors. The report will be evaluated based on active participation during the experiment, demonstration, and record-keeping.	4

Or Any practical in converted form can be taken for assessment. (25 marks) & Any of the experiential learning, such as portfolios, reflections, or presentations, can be taken as an assessment. (25 marks)	

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 8 : تحقیقاتی رپورٹ اور سائنسی و علمی تحریر (Scientific Writing and Research Reporting)						
Module Learning Objectives **(At the end of the module, the students should be able to)** • Develop an experimental design for animal research. • Prepare a study protocol based on the PREPARE guidelines. • Create a research paper according to ARRIVE criteria. • Recognize ways to avoid plagiarism. • Describe publication ethics.						
Unit 1 حیوانات پر ریسرچ و تحقیق کے تجرباتی مناہج (Experimental Design for Animal Research) 8.1.1 Definition of Experimental design 8.1.2 Importance of Experimental design 8.1.3 Types of Experimental design 8.1.4 Experimental Unit 8.1.5 Randomization: Importance and types 8.1.6 Control and its types 8.1.7 Sample size **References:** 24,26,27,28,29,30,31,32,33						

3A	3B	3C	3D	3E	3F	3G
CO 5	Discuss the experimental design in research involving animals	2	Lecture	CAP	Knows-how	L&GD,L&PPT
CO 5	Calculate sample size for a pharmacological study	3	Practical8.1	PSY-GUD	Shows-how	PT,TUT
CO 5	Choose a suitable animal model to screen the anti-ulcer action of Unani drugs among available experimental models.	2	Experiential-Learning8.1	CE	Knows-how	BS,DIS
CO 5	Allocate the animals into different groups.	2	Practical8.2	CK	Knows-how	DG
CO 5	Frame an experimental design to screen anti-inflammatory drugs by software.	4	Experiential-Learning8.2	CAP	Shows-how	SDL

Unit 2 پری پیئر کے رھنماءاصول (PREPARE Guidelines)

8.2.1 Introduction to PREPARE guidelines

8.2.2 Components

8.2.3 Formulation of the study

8.2.4 Dialogue between Scientist and animal facility

8.2.5 Quality control of the component in the study

References: 24,25,26,27,28,29,30,31,32,33

3A	3B	3C	3D	3E	3F	3G
CO 5	Describe PREPARE guidelines	2	Lecture	CAP	Knows-how	L&PPT
CO 5	Enumerate the components of PREPARE Guidelines	3	Practical8.3	CAP	Knows-how	D
CO 5	Illustrate the components of the framing a protocol of the study.	3	Practical8.4	CAP	Knows-how	CBL,D

CO 5	Prepare a protocol to evaluate the effect of Unani analgesic drugs in the light of PREPARE Guidelines.	6	Experiential-Learning8.3	CC	Knows-how	BL

Unit 3 ارائیو کے رہنماءاصول(ARRIVE Guidelines)

8.3.1 Introduction to ARRIVE guidelines

8.3.2 Components of ARRIVE guidelines

8.3.3 Reporting of *in vivo* experiments

References: 24,25,26,27,28,29,30,31,32,33

3A	3B	3C	3D	3E	3F	3G
CO 5	Describe the components of ARRIVE Guidelines	2	Lecture	CAP	Knows-how	L&PPT
CO 5	Illustrate the components Animal Research and Reporting of In Vivo Experiments (ARRIVE) Guidelines.	3	Practical8.5	PSY-GUD	Shows-how	PER
CO 5	Analyze a research paper based on an in vivo experiment in the light of ARRIVE guidelines.	6	Experiential-Learning8.4	CC	Shows-how	BL,BS,JC

Unit 4 سرقہ،اشاعتی اخلاقیات،کوپ کے رہنمااصول (Plagiarism, Publication Ethics, COPE Guidelines, and ICMJE Recommendations)

8.4.1 Plagiarism

8.4.1.1 Define Plagiarism

8.4.1.2 Discuss measures to avoid Plagiarism in scientific writing

8.4.1.3 Name the Plagiarism checker software

8.4.1.4 Check a manuscript by using plagiarism checker software.

8.4.2 Publication Ethics and ICMJE Recommendations

8.4.2.1 Define Publication Ethics and explain its importance

8.4.2. 2 Discuss COPE Guidelines

8.4.2.3 Enumerate the components of COPE

8.4.2.4 Explain the ICMJE Recommendations

References: 24,25,26,27,28,29,30,31,32,33

3A	3B	3C	3D	3E	3F	3G
CO 6	Discuss measures to avoid Plagiarism in scientific writing.	2	Lecture	CAP	Knows-how	TUT
CO 8	Discuss the Publication Ethics and its importance	2	Lecture	AFT-CHR	Knows-how	L&PPT
CO 8	Demonstrate the Committee on Publication Ethics (COPE) guidelines .	3	Practical8.6	AFT-CHR	Knows-how	D
CO 8	Enumerate the components of the Committee on Publication Ethics guidelines (COPE).	3	Practical8.7	AFT-CHR	Knows-how	D
CO 8	Perform a plagiarism check of a manuscript by using software.	4	Experiential-Learning8.5	PSY-GUD	Shows-how	IBL,PSM
CO 6	Prepare a manuscript by following the International Committee of Medical Journal Editors (ICMJE) Recommendations.	4	Experiential-Learning8.6	CAN	Knows-how	CBL

Practical Training Activity

Practical 8.1 : Sample size calculation.

Total duration: 3 hrs

The teacher will demonstrate to the stuents calculation of sample size for a pharmacological study using software, The students will repeat the use of software to calculate the sample size for screening the antipyretic action of a drug.

Practical 8.2 : Randomization of animals.

Total Hours: 2

The teacher will demonstrate the allocation of animals to different groups and how they will be randomized for temperature, light exposure, and rack position in an animal house.

Practical 8.3 : Demonstraion on PREPARE guidelines

Total hours: 3

Students will prepare a poster on the components of PREPARE guidelines. The posters will then be presented in the class.

The breakdown of the practical focusing on poster preparation and presentation based on the PREPARE guidelines is as follows:

Poster Development: 1.5 hours

- The teacher will brief on the purpose and importance of PREPARE (Planning Research and Experimental Procedures on Animals: Recommendations for Excellence)
- Divide students into small groups. Students work collaboratively to identify key components of the PREPARE checklist, design a visually appealing and informative poster, use headings, sub-points, diagrams, and examples where needed, and teacher provides support and feedback during poster development

Block 2 (: Poster Presentation & Discussion: 1.5 hours

- Groups display their posters around the room or on boards. Each group presents their poster (5–7 minutes per group depending on total number) focusing on clarity, content accuracy, and creativity in representation.
- Classmates ask questions and provide feedback. Teacher summarizes key takeaways, reinforces correct concepts, offers suggestions for improvement and connect the PREPARE framework to real-life research practices.

Practical 8.4 : Framing a protocol

Total Hours: 3

The teacher will demonstrate the students how to frame a pharmacological study with the help of a published study. The students will make a poster on framing a protocol of the study on anti-diabetic activity and explain it in a seminar presentation.

The breakdown of the activity incorporating both teacher-led demonstration and student-centered poster creation and presentation is as follows:

Teacher Demonstration & Group Planning: 1.5 hours

- The teacher will demonstrate protocol through of a published pharmacological study (preferably on anti-diabetic activity), emphasis on key elements like hypothesis, animal model, dosing, controls, outcome measures, ethics, and mapping these elements to a structured protocol
- Divide students into small groups. Assign or let them choose a hypothetical anti-diabetic study concept, groups begin outlining their protocol for the poster, and teacher provides guidance

Poster Creation & Seminar Presentation: 1.5 hours

- Each group finalizes their study protocol, creates a poster highlighting title, background & rationale, objectives, study design, animal model, treatment groups & dosing, outcome measures, and ethical considerations.
- Each group presents their poster (5–7 mins each), focus on clarity, rationale, and ethical justification.
- Teacher and peers provide feedback, recap of learning outcomes, and discussion on real-world applicability

Practical 8.5 : ARRIVE Guidelines

Total Hours: 3

The teacher will demonstrate various components of ARRIVE Guidelines with the help of a published paper. Students will be required to make a poster on the components of ARRIVE Guidelines and then explain it to the teacher. The teacher will assess the poster and guide the students for imlications.

The breakdown ofthe practical session focusing on the ARRIVE Guidelines (Animal Research: Reporting of In Vivo Experiments) is as follows:

Demonstration & Understanding: 1.5 Hours

- Teacher explains the purpose and importance of ARRIVE, and covers the role of reporting standards in animal research ethics and reproducibility, Teacher brief components of ARRIVE (e.g., Title, Abstract, Objectives, Methodology, Animal Details, Results, Ethics, etc.).
- Teacher presents a sample research article that follows ARRIVE, identifies and explains how the paper addresses each ARRIVE component, highlights good practices and common pitfalls. Opens floor for doubts and clarification on ARRIVE and the example paper.
- Teacher explains the poster-making task, provides structure/expectations for poster content and student presentations.

Poster Creation & Presentation: 1.5 Hours

- Students work individually or in pairs to create a poster. Poster must outline each component of ARRIVE with brief descriptions and visuals/examples.
- Each student/group presents their poster to the teacher, give brief explanation of what they've included.

- Teacher evaluates the posters based on understanding of guidelines, clarity and presentation, vsual and conceptual creativity, and Provides verbal or written feedback. Teacher also discusses implications of poor reporting and benefits of compliance with ARRIVE. The teacher optionally may Provide ARRIVE checklist (latest version from NC3Rs website), sample templates for posters, and example of a well-structured animal research paper

Practical 8.6 : Demonstration on COPE guidelines

Total duration: 3 hrs

The teacher demonstrates various areas of COPE guidelines with the help of pre selected article. The teacher will now instruct the students to select various types of articles and observe the COPE guidelines followed by the selected articles.Students will prepare a presentation of the same and present before the teacher. The teacher will analyze his/her learning ability and understanding with a pre formatted checklist and conclude the presentation session.

Practical 8.7 : Chart regarding COPE guidelines.

Total duration: 3 hrs

The teacher will demonstrate the important components of the COPE guidelines. The students will observe tcarefully, study the COPE guidelines and create a chart outlining the components of COPE guidelines.They will submit the same to the teacher for assessment and further guidence.

The pointwise breakdown of the activity are as follows:

Introduction & Teacher Demonstration (60 minutes)

- Teacher introduces the session, and explains what COPE is and why publication ethics matter. Teacher presents the key principles and components, uses examples or case studies to illustrate real-world relevance.
- Teacher explains major areas of COPE (authorship, plagiarism, misconduct, etc.), shows how these are applied in real publishing scenarios. Teacher may use visual aids or slides. Students ask questions about anything unclear and teacher provides clarification before students begin their work.

Student Study & Chart Creation (60 minutes)

- Students review printed or digital COPE guidelines and focus on understanding the structure and key components. Students decide how to present the components (flowchart, table, mind map, etc.).
- Students work individually or in pairs to make a visual chart and highlight key components with short descriptions.

Submission, Review & Guidance (60 minutes)

- Students submit their completed charts to the teacher. Students display their charts for classmates to view to promotes peer learning and idea exchange.

- Teacher gives general feedback to the class, highlights strong points and areas of improvement.Teacher offers additional resources or tips, and explains how the activity links to broader ethical research practices.

Experiential learning Activity

Experiential-Learning 8.1 : Suitable animal model to screen the anti-ulcer action of Unani drugs among available experimental models.

Total duration: 2 hrs

The teacher will instruct the student to note anti-ulcer animal models from books/journal papers. The teacher will conduct a group discussion on the selection of suitable animal models to screen anti-ulcer drugs by analyzing each model for its feasibility by the given conceptual understanding of disease and drugs in Unani medicine.

Experiential-Learning 8.2 : Framing of Experimental design by software.

Total duration: 4 hrs

The Teacher will assign each student to frame an experimental design to screen anti-inflammatory drugs by using software.

Experiential-Learning 8.3 : Preparation of Protocol.

Total duration: 6 hrs

The teacher will instruct the students to prepare an assignment to develop a protocol for screening analgesic drugs using the PREPARE guidelines. The teacher will first demonstrate the protocol development for screening analgesic activity of a Unani drug in tune with PREPARE guidelines and then students will be given other drugs with claimed analgesic action to prepare the protocol accordingly.

The breakdown of this practical session ensuring effective instruction, demonstration, and student participation in line with the PREPARE guidelines is as follows:

Introduction & Demonstration (2 hours)

- The teacher gives Introduction to the PREPARE guidelines (Planning Research and experimental Procedures on animals and recommendations for Excellence), brief overview of analgesic drug screening methods, and introduction to Unani medicine and rationale for selecting a Unani drug.
- Live demonstration of protocol development for screening analgesic activity of a selected Unani drug, highlighting each PREPARE element of ethical considerations, animal model selection, pain models (e.g., hot plate, tail flick, writhing test), dose and administration, data collection and interpretation, and inimizing animal distress.

Group Work on Assignment (2 hours)

- Students are divided into small groups, each assigned a different drug with claimed analgesic activity (could include other Unani or herbal drugs). Each group begins developing a detailed screening protocol using the PREPARE framework. The teacher will be providing guidance and feedback.

Refinement & Presentation (2 hours)

- Finalize protocol drafts. Each group polishes their protocol and prepares to present. a group presentations.Teacher and peers provide constructive feedback. Teacher summarizes key takeaways, common challenges, and suggestions for improvement.

Experiential-Learning 8.4 : Paper presentation highlighting ARRIVE guidelines

Total duration: 6 hrs

The teacher will assign a paper to each of the students. The students will present research paper in a journal club highlighting the adhered ARRIVE guidelines.. Students and teachers will review the paper to ensure that the papert adheres to the ARRIVE principles . Any lacuna will be highlighted and discussed. The teacher will assess the paper with pre formatted checklist and conclude the journal club session.

The breakdown the activity structured around a Journal Club session focused on the ARRIVE Guidelines is as follows:

Paper Assignment & Preparation (2 Hours)

- Teacher explains objectives, expectations, and evaluation method, brief recap of ARRIVE Guidelines and their importance in animal research reporting.
- Each student is assigned a different published animal research paper. Teacher provides checklist or template for assessing ARRIVE compliance.
- Students individually analyze their assigned paper for identify components aligned with ARRIVE, note any missing or poorly reported sections, prepare a short presentation (slides or summary), and teacher provides guidance and support as needed.

Journal Club Presentations – Part 1 (2 Hours)

- Each student presents their assigned paper (~7–10 minutes each) mentioning overview of study, ARRIVE components addressed, gaps or missing elements, and the peers and teacher ask questions after each presentation.
- Teacher encourages critical thinking about the impact of poor reporting.

Review & Assessment of presentations (2 Hours)

- For classes with more students, continue presentations. Teacher leads review & Discussion for each paper. The teacher reviews ARRIVE compliance using a pre-formatted checklist highlights strengths and reporting gaps, and provides individual and group feedback.
- Teacher fills out checklist or rubric for each student. Scores or comments based on understanding, presentation, and critical analysis.

- The teacher will provide summary of key learning points, discuss real-world implications of non-compliance with ARRIVE, encourage students to apply these principles in their own research.

Note: The teacher may need ARRIVE 2.0 checklist (print/digital), Sample presentation template, Evaluation rubric for student presentations, and Feedback form or notes sheet.

Experiential-Learning 8.5 : Plagiarism checking

Total duration:4 hrs

he teacher will instruct the students to surf the internet for plagiarism software. Read all the detailed instructions provided by the software. Students will be assigned a text to check for plagiarism using plagiarism detection software. They will note the plagiarized sentences and cross check the detected sources and percentage of the plagiarized text. The teacher will guide all throughout the activity and clear the students doubts. The students will submit their observations as an written assignment.

The structured breakdown of the activity focusing on exploring plagiarism detection tools and applying them practically, with teacher guidance throughout isd as follows.

Exploration and Instruction (2 Hours)

- The teacher will give a brief explanation of plagiarism, its implications in academic writing, and the role of detection tools, outline the activity goals and expectations for the written assignment.
- Students search for free or trial-based plagiarism software (e.g., Grammarly, Quetext, Turnitin, Plagscan, PlagiarismDetector.net). They explore How each tool works, user instructions, features (e.g., similarity percentage, source links, sentence-by-sentence analysis), and teacher moves around (if in-person) or checks in (if online) to assist and guide.
- Each student selects one software they feel comfortable using. They read the detailed user instructions, understand reporting features, and prepare to apply it.
- Students ask questions or share challenges they faced while exploring the tools. Teacher explains key points, like interpreting plagiarism reports, false positives, and limitations of tools.

Application and Submission (2 Hours)

- Students are provided a pre-selected sample text by the teacher. They upload or paste the text into their chosen plagiarism tool. They carefully review highlighted plagiarized sentences,sSource links, plagiarism percentage, and accuracy of matches (false vs true positives),
- Students write down hhich tool they used and why, what the software detected (with examples), their assessment of the tool's accuracy and reliability, and any discrepancies or surprises in the report.
- Students compile their findings into a short report (1–2 pages), including tool overview, results summary, and personal reflections. Teacher collects or receives assignments.

- Teacher guide students in choosing tools, explain technical terms (e.g., similarity index, source referencing), help interpret software results, and provide clarity on academic integrity.

Experiential-Learning 8.6 : Manuscript preparation following International Committee of Medical Journal Editors (ICMJE) recommendations

Total duration: 4 hrs

The teacher will instruct the students to read ICMJE recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journal. They will be assigned to write a manuscript that fullfills the ICMJE Recommendations. The students will write their observations and present it to the teacher in the form of a presentation. The teacher will assess the same with a preformatted checklist, summarise and conclude the presentation session.

Here is the breakdown of the activity as follows:

Understanding and Application of ICMJE Recommendations: 2 hours

- Teacher gives a short overview of ICMJE Recommendations and their importance in scholarly publishing.Students are instructed to read the ICMJE Recommendations independently or in small groups. *(Provide printed copies or share the official link: https://www.icmje.org/recommendations/)*

- Students are assigned the task of drafting a short mock manuscript (e.g., abstract, intro, methods, results, and discussion) based on a topic (you can assign or let them choose). They must ensure the manuscript aligns with ICMJE standards—particularly authorship, structure, ethics, and reporting standards. Teacher may support or clarify doubts during this period.

Observation, Presentation, and Assessment: 2 hours

- Students write down their observations from applying the ICMJE guidelines—what they found challenging, important aspects, and insights gained. They create a brief presentation (PowerPoint or verbal with notes) summarizing their manuscript and observations.

- Each student or group presents their work. The teacher uses a preformatted checklist (rubric) to assess based on understanding of ICMJE principles, manuscript quality, and presentation clarity and insight

- Teacher gives feedback, highlights common strengths and areas of improvement, summarizes key takeaways from the session and encourages adherence to publication ethics.

Modular Assessment

Assessment method	**Hour**

Instructions: Conduct a structured modular assessment. Assessment will be for 50 for this module. Keep structured marking patterns. Use different assessment methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the modular grade point as per Table 6C. 1. **Practical: 30 Marks** Each student will be tasked with framing an experimental design for screening analgesic/antipyretic/anti-inflammatory Unani drugs. The students' assessment will be based on the design framed by them for a particular study, such as the objective, methodology, study design, species used, animal model, 3Rs, etc. 2. **Experiential Learning: 20 Marks** Each student will be given a published research article to assess the elements of ARRIVE Guidelines. The student's analysis of the ARRIVE Guidelines' criteria, outlining the article's strong points and any missing details, will be evaluated. Or Any practical in converted form can be taken for assessment. (25 marks) & Any of the experiential learning, such as portfolios, reflections, or presentations, can be taken as an assessment. (25 marks)	4

Table 4 : Practical Training Activity

(*Refer table 3 of similar activity number)

Practical No*	Practical name	Hours
1.1	Preliminary Phytochemical analysis of herbal drugs	2
1.2	Preliminary Phytochemical analysis	2
1.3	Qualitative analysis of secondary metabolites	4
1.4	Quantitative analysis of secondary metabolites	4
1.5	Physicochemical analysis of secondary metabolites	8
2.1	Chromatographic Techniques of TLC and Paper chromatography	10
2.2	Chromatographic Techniques of Column Chromatography, Gas Chromatography & Supercritical Fluid Chromatography	10
3.1	Pharmacopoeial standardization of Hab/Qurs.	8
3.2	Aflatoxin and Microbial contamination, Pesticide residue, and Heavy Metals assessment during stability studies	6
3.3	Adulteration of crude drugs	4
3.4	SOPs for various classical drug dosage forms of Unani medicine.	2
4.1	Animal experiments for testing drugs in classical literature	1
4.2	Phases of drug development of given drug.	1
4.3	Various factors affecting drug response in animals	4
4.4	Translation of human therapeutic dose across species	4
4.5	Various routes of drug administration using simulated software.	4
4.6	Different methods of anaesthesia and euthanasia in laboratory animals using simulation.	2
4.7	Blood withdrawal techniques and simulated software	4
5.1	Protocol for blind screening	4
5.2	Irwin’s Profile and Functional Observational Battery	4

5.3	Protocol with four-point Bioassay method	2
5.4	Organ bath system and its components	2
5.5	Physiological salt solution praparation	2
5.6	Dose-response curve of Acetylcholine using simulation software	2
5.7	Procedure of cell-based cytotoxicity assay	4
6.1	The toxicity requirements as per New Drug and Clinical Trial (NDCT) Rule-2019	4
6.2	Acute toxicity study using simulation/video	6
6.3	Analysis of the published reports on carcinogenicity	2
6.4	Skin sensitization test	4
6.5	Acute dermal irritation test	4
7.1	Demonstration of the working principle of Eddy's hot plate test.	1
7.2	Demonstration of the working principle of the Tail flick response apparatus.	1
7.3	Thermoprobe/thermometers used to record temperature in small laboratory animals	1
7.4	Demonstration of the Digital Plethysmometer.	1
7.5	Selection of the most suitable animal model to screen Unani drugs for anti-ulcer activity.	1
7.6	Restraint ulcer in rat	1
7.7	Ulcerogenic agents	1
7.8	Poster presentation	1
7.9	Poster presentation	1
7.10	Making Chart	1
7.11	Chart preparation on diabetogenic agents.	1
7.12	Simulation experiment	1
7.13	Demonstration on instrument	1

7.14	Chart preparation for animal models used in anti-depressant activity,	1
7.15	Assessment parameters for antidepressant activity.	1
7.16	Demonstration of instrument, Electroconvulsometer.	1
7.17	Demonstration on antiepileptic activity	1
7.18	In vivo experiment on simulated software	1
7.19	Demonstration on cognition test	1
7.20	Morris Water Maze Test	1
8.1	Sample size calculation.	3
8.2	Randomization of animals.	2
8.3	Demonstraion on PREPARE guidelines	3
8.4	Framing a protocol	3
8.5	ARRIVE Guidelines	3
8.6	Demonstration on COPE guidelines	3
8.7	Chart regarding COPE guidelines.	3

Table 5 : Experiential learning Activity

(*Refer table 3 of similar activity number)

Experiential learning No*	Experiential name	Hours
1.1	Drug formulation standardisation described by Attar Israeli.	2
1.2	Razi's methods for identifying drugs according to various diseases	2
1.3	High end instruments used in standerdization	8
1.4	Identification of secondary metabolites	7
1.5	Quantitative estimation of secondary metabolites	7
2.1	High-end chromatographic techniques	10
2.2	Working principles of various Spectroscopic Techniques	8
2.3	Techniques for Particle Size Analysis of Unani drugs	8
3.1	Pharmacopoeia Standardization of Unani Formulations	8
3.2	Instruments used for assessing the stability studies of Unani Formulations	9
3.3	Storage and transport of crude rugs	6
3.4	Accreditation process of the NABL	3
4.1	Experimental protocols in Unani Medicine	4
4.2	Various phases of drug discovery and development	4
4.3	Laboratory animals for research in Unani medicine	8
4.4	Routes of drug administration in animals	3
4.5	Methods of anaesthesia for small animals.	3
4.6	Mock IAEC meeting	4
5.1	Overview of high-throughput screening.	4

5.2	Recent advances in Bioassay Techniques.	4
5.3	Various types of Physiological salt solutions, their applications, and the role of different ingredients	4
5.4	Principle of physiograph and recording of tissue response	4
5.5	Dose-response curve of Serotonin on isolated Rat stomach (fundus part) strip using simulation	2
5.6	Refinement in animal research	4
5.7	Various alternative methods for testing skin irritation and skin sensitization	4
6.1	Requirement of regulatory toxicity for new drug approval	2
6.2	Evaluation of toxicity studies	6
6.3	Protocol for acute or repeated dose toxicity for given unani formulation	4
6.4	Guidelines for genotoxicity and carcinogenicity studies	4
6.5	Protocol for reproductive and developmental toxicity	2
6.6	The sientific profile of substances for reproductive or developmental toxicity	2
6.7	Skin irritation test	4
6.8	Presentation of a published local toxicity study	2
7.1	Determination of analgesic activity of morphine using simulation software by analgesiometer in mice.	2
7.2	Determination of analgesic activity of morphine using simulation software by hot plate method in mice.	2
7.3	Analgesic activity of aspirin using simulation software by acetic acid-induced writhing test	3
7.4	Anti-inflammatory activity on simulation software by Plethysmometer.	2
7.5	Antiulcer activity using simulated software.	2
7.6	Ex vivo experiment	1
7.7	Evaluation of hepatoprotective animal models.	2
7.8	Brain storming session on selection of animal models for nephroprotective activity	1
7.9	Analysis of the streptozotocin and alloxan induced diabetes animal model.	1

7.10	High fat diet formulation	1
7.11	Elevated plus maze test	1
7.12	Anti convulsant activity on simulated software.	1
7.13	Pentylene tetrazole seizure test by simulated software.	2
7.14	In vivo experiment on simulated software.	2
7.15	Screening of CNS drugs on simulated software	1
7.16	Muscle relaxant activity on simulated software.	1
7.17	In vivo experiment on simulated software.	1
8.1	Suitable animal model to screen the anti-ulcer action of Unani drugs among available experimental models.	2
8.2	Framing of Experimental design by software.	4
8.3	Preparation of Protocol.	6
8.4	Paper presentation highlighting ARRIVE guidelines	6
8.5	Plagiarism checking	4
8.6	Manuscript preparation following International Committee of Medical Journal Editors (ICMJE) recommendations	4

Table 6 : Assessment Summary: Assessment is subdivided in A to H points
6 A : Number of Papers and Marks Distribution

Subject Code	Paper	Theory	Practical	Total
UNIPG-AB-IA	1	100	200	300

6 B : Scheme of Assessment (Formative and Summative Assessment)

Credit frame work

UNIPG-AB-IA consists of 8 modules totaling 16 credits, which correspond to 480 Notional Learning Hours. Each credit comprises 30 Hours of learner engagement, distributed across teaching, practical, and experiential learning in the ratio of 1:2:3. Accordingly, one credit includes 5 hours of teaching, 10 hours of practical training, 13 hours of experiential learning, and 2 hours allocated for modular assessment, which carries 25 marks.

Formative Assessment : Module wise Assessment:will be done at the end of each module. Evaluation includes learners active participation to get Credits and Marks. Each Module may contain one or more credits.

Summative Assessment: Summative Assessment (University examination) will be carried out at the end of Semester II.

6 C : Calculation Method for Modular Grade Points (MGP)

Module Number & Name (a)	Credits (b)	Actual No. of Notional Learning Hours (c)	Attended Number of notional Learning hours (d)	Maximum Marks of assessment of modules (e)	Obtained Marks per module (f)	MGP =d*f/c*e*100
M1. ادویاتی مشاہدات کے روایتی طریقے اور یونانی ادویہ کی معیار بندی (Classical methods of drug observation and Standardization of Unani Drugs)	2	60		50		
M2. ادویہ کی معیار بندی میں تجزیاتی تکنیک اور آلہ جاتی طریقوں کا استعمال (Analytical Techniques and Instrumental Methods Used in Drug Standardization)	2	60		50		
M3. ادویہ مفردہ اور ادویہ مرکبہ کی معیار بندی (عرق، معجون، سفوف، قرص، حب، روغن، مرہم، ضماد) (Standardization of Single and Compound Formulations (Arq, Majoon, Safoof, Sharbat, Qurs, Habb, Roghan, Marham & Zimad)	2	60		50		
M4. تجرباتی علم الادویہ کے مبادیات (Essentials of Experimental Pharmacology)	2	60		50		

M5. ادویاتی چھان بین، حیاتیاتی جانچ اور دیگر طریقہ کار (Pharmacological Screening, Bioassay and Alternative Models)	2	60		50		
M6. علم السموم۔متعلقہ ضابطہ و قوانین اور ان کے مبادیات (Fundamentals of Regulatory Toxicology)	2	60		50		
M7. زندہ حیات میں ادویاتی افعال و خواص کے چھان بین کے طریقے (In-vivo Methods of Drug Screening)	2	60		50		
M8. تحقیقاتی رپورٹ اور سائنسی و علمی تحریر (Scientific Writing and Research Reporting)	2	60		50		
MGP = ((Number of Notional learning hours attended in a module) X (Marks obtained in the modular assessment) / (Total number of Notional learning hours in the module) X (Maximum marks of the module)) X 100						

6 D : Semester Evaluation Methods for Semester Grade point Average (SGPA)

SGPA will be calculated at the end of the semester as an average of all Module MGPs. Average of MGPS of the Semester For becoming eligible for Summative assessment of the semester, student should get minimum of 60% of SGPA

SGPA = Average of MGP of all modules of all papers = add all MGPs in the semester/ no. of modules in the semester Evaluation Methods for Modular Assessment

A S.No	B Module number and Name	C MGP
1	M1. ادویاتی مشاہدات کے روایتی طریقے اور یونانی ادویہ کی معیار بندی (Classical methods of drug observation and Standardization of Unani Drugs)	C 1
2	M2. ادویہ کی معیار بندی میں تجزیاتی تکنیک اور آلہ جاتی طریقوں کا استعمال (Analytical Techniques and Instrumental Methods Used in Drug Standardization)	C 2
3	M3. ادویہ مفردہ اور ادویہ مرکبہ کی معیار بندی (عرق، معجون، سفوف، قرص، حب، روغن، مرہم، ضماد) (Standardization of Single and Compound Formulations (Arq, Majoon, Safoof, Sharbat, Qurs, Habb, Roghan, Marham & Zimad)	C 3
4	M4. تجرباتی علم الادویہ کے مبادیات (Essentials of Experimental Pharmacology)	C 4
5	M5. ادویاتی چھان بین، حیاتیاتی جانچ اور دیگر طریقہ کار (Pharmacological Screening, Bioassay and Alternative Models)	C 5
6	M6. علم السموم۔متعلقہ ضابطہ و قوانین اور ان کے مبادیات (Fundamentals of Regulatory Toxicology)	C 6
7	M7. زندہ حیات میں ادویاتی افعال و خواص کے چھان بین کے طریقے (In-vivo Methods of Drug Screening)	C 7
8	M8. تحقیقاتی رپورٹ اور سائنسی و علمی تحریر (Scientific Writing and Research Reporting)	C 8

	Semester Grade point Average (SGPA)	(C1+C2+C3+C4+C5+C6+C7+C8) / Number of modules(8)

S. No	Evaluation Methods
1.	Method explained in the Assessment of the module or similar to the objectives of the module.

6 E : Question Paper Pattern

MD/MS Unani Examination
UNIPG-AB-IA
Sem II
Time: 3 Hours ,**Maximum Marks:** 100
INSTRUCTIONS: All questions compulsory

		Number of Questions	Marks per question	Total Marks
Q 1	Application-based Questions (ABQ)	1	20	20
Q 2	Short answer questions (SAQ)	8	5	40
Q 3	Analytical based structured Long answer question (LAQ)	4	10	40
				100

6 F : Distribution for summative assessment (University examination)

S.No	List of Module/Unit	ABQ	SAQ	LAQ
(M- 1) ادویائی مشاہدات کے روایتی طریقے اور یونانی ادویہ کی معیار بندی (Classical methods of drug observation and Standardization of Unani Drugs) (Marks: Range 5-20)				
1	**(U-1)** ادویہ کی ترکیب وصناعت میں حلیم عطار اسرائیلی کا مشاہداتی طریقہ (Attar Israeli's method of observation in drug formulation)	No	Yes	No
2	**(U-2)** ادویہ کی تحقیق وتشخیص میں رازی کا مشاہداتی طریقہ (Razi's Observational techniques in drug evaluation)	No	Yes	No
3	**(U-3)** یونانی ادویہ کی معیار بندی (Standardization of Unani Drugs)	No	Yes	Yes
4	**(U-4)** مختلف کیمیاوی اجزاء نباتیہ کی کیفی تشخیص کے کیمیاوی طریقے (Qualitative chemical test for different Phyto-constituents)	Yes	Yes	Yes
5	**(U-5)** مختلف کیمیاوی اجزاء نباتیہ کی کمیت کی تعیین کے کیمیاوی طریقے (Quantitative Chemical Tests for different Phyto-Constituents)	Yes	Yes	Yes
6	**(U-6)** معیار بندی کے طبعی وکیمیاوی طریقے (Physiochemical Methods of Standardization)	Yes	Yes	Yes
(M- 2) ادویہ کی معیار بندی میں تجزیاتی تکنیک اور آلہ جاتی طریقوں کا استعمال (Analytical Techniques and Instrumental Methods Used in Drug Standardization) (Marks: Range 5-20)				

1	**(U-1)** ادویہ کی معیار بندی میں تجزیاتی تکنیک اور آلہ جاتی طریقوں کے استعمال کے اغراض و مقاصد اور اقسام (Types, aims and objectives of Analytical Techniques and Instrumental Methods Used in Drug Standardization)	No	Yes	No
2	**(U-2)** ادویہ کی معیار بندی میں لون نگاری کی تکنیک (Chromatographic techniques in drug standardization)	Yes	Yes	Yes
3	**(U-3)** اسپکٹروا سکوپی اور اسکی قسمیں (Spectroscopy & its types)	No	Yes	No
4	**(U-4)** برقیہ حرکت کے طریقے ذرائی حجم کا تجزیہ، ایکس رے تحلل تجزیہ (Method of Electrophoresis, Particlesize analysis and X-ray Diffraction(XRD) Analysis)	No	Yes	No
(M- 3) ادویہ مفردہ اور ادویہ مرکبہ کی معیار بندی (عرق، معجون، سفوف، قرص، حب، روغن، مرا ہم، ضماد) (Standardization of Single and Compound Formulations (Arq, Majoon, Safoof, Sharbat, Qurs, Habb, Roghan, Marham & Zimad) (Marks: Range 5-20)				
1	**(U-1)** عملیات اور مصنوعات کی معیار بندی (Process and Product Standardization)	No	Yes	Yes
2	**(U-2)** مطالعاتِ استحکام اور ادویہ کی مدت حیات (Stability studies and Shelf life)	Yes	Yes	Yes
3	**(U-3)** ادویاتی اوصاف پر اثرانداز ہونے والے عوامل (Factors affecting the quality of drugs)	Yes	Yes	Yes
4	**(U-4)** ادویاتی صنعت کے رہنما دستور، معیاری طریقہ کار اور این اے بی ایل کی منظوری (GMP, SOPs and NABL accreditation)	No	Yes	No
(M- 4) تجربائی علم الادویہ کے مبادیات (Essentials of Experimental Pharmacology) (Marks: Range 5-20)				
1	**(U-1)** ادویہ کے نمو و ارتقاء کے روایتی طریقے (Classical Method of Drug Development)	Yes	Yes	Yes
2	**(U-2)** ادویہ کی تلاش اور اس کے ارتقاء میں ماقبل سریریائی تحقیقات کا جائزہ (Overview of preclinical research in drug discovery and development)	Yes	Yes	Yes
3	**(U-3)** تجربائی علم الادویہ میں مستعمل تجربہ گاہی حیوانات (Laboratory Animals in Experimental Pharmacology)	Yes	Yes	Yes
4	**(U-4)** عمومی تجربہ گاہی تسہیلیں (Common Laboratory Techniques)	Yes	Yes	Yes
5	**(U-5)** تجربہ گاہی جانداروں کے رکھ رکھاؤ، تجربہ سے متعلق حیوانی اخلاقیات او سی سی ایس ای اے کے رہنما اصول و ضوابط (Laboratory animal ethics and CCSEA guidelines for laboratory animal handling and experimentation)	Yes	Yes	Yes
(M- 5) ادویاتی چھان بین، حیاتیاتی جانچ اور دیگر طریقہ کار (Pharmacological Screening, Bioassay and Alternative Models) (Marks: Range 5-20)				
1	**(U-1)** ادویاتی چھان بین (Drug Screening)	Yes	Yes	Yes
2	**(U-2)** ادویہ عصبانیہ کی چھان بین (Neuropharmacological Screening)	Yes	Yes	Yes
3	**(U-3)** حیاتیاتی جانچ (Bioassay)	Yes	Yes	Yes
4	**(U-4)** علیحدہ اور الگ کئے کئے السجہ پر تجربات (Isolated Tissue Experiments)	Yes	Yes	Yes
5	**(U-5)** Concept of 3R's and alternatives to animal experiments	Yes	Yes	Yes
(M- 6) علم السموم۔ متعلقہ ضابطہ و قوانین اور ان کے مبادیات (Fundamentals of Regulatory Toxicology) (Marks: Range 5-20)				
1	**(U-1)** علم السموم۔ متعلقہ ضابطہ و قوانین (Regulatory Toxicology)	Yes	Yes	Yes
2	**(U-2)** سمیات سے متعلق قوانین و ضوابط (Regulatory Toxicity Guidelines)	Yes	Yes	Yes
3	**(U-3)** نظامی مطالعات سمیت (Systemic toxicity studies)	Yes	Yes	Yes
4	**(U-4)** جینیاتی و سرطان زائی سمیت (Genotoxicity and Carcinogenicity)	Yes	Yes	Yes

5	**(U-5)** سمیت دوران تولید وارتقاء جنین (Reproductive and Developmental Toxicity)	Yes	Yes	Yes
6	**(U-6)** جلد کی حساسیت اور مقامی سمیت (Local Toxicity and Skin Sensitization)	Yes	Yes	Yes
(M- 7) ذی حیات میں ادویاتی افعال وخواص کے چھان بین کے طریقے (In-vivo Methods of Drug Screening) (Marks: Range 5-20)				
1	**(U-1)** حیوانات میں مواد ادویہ کے دافع الم، دافع حمیٰ اور حلل تعل پر جانچ پڑتال (Animal Models for Evaluating Analgesic, Antipyretic, Anti-inflammatory Activity)	Yes	Yes	Yes
2	**(U-2)** حیوانات میں مواد ادویہ کے دافع قرحہ تعل پر جانچ پڑتال (Animal Models for Evaluation of Anti-ulcer Activity)	Yes	Yes	Yes
3	**(U-3)** حیوانات میں مواد ادویہ کے قلب و دوران خون پر اثر پذیری کی جانچ پڑتال (Animal Models for Evaluation of the Effect of Drugs on the Cardiovascular System)	Yes	Yes	Yes
4	**(U-4)** حیوانات میں مواد ادویہ کے محافظ کبد تعل کی جانچ پڑتال (Hepatoprotective Activity)	Yes	Yes	Yes
5	**(U-5)** حیوانات میں مواد ادویہ کے محافظ کلیہ تعل کی جانچ پڑتال (Animal Models for Evaluation of Nephroprotective Activity)	Yes	Yes	Yes
6	**(U-6)** حیوانات میں مواد ادویہ کے دافع ذیابیطس تعل کی جانچ پڑتال (Animal Models for Evaluation of Hypoglycaemic Activity)	Yes	Yes	Yes
7	**(U-7)** حیوانات میں مواد ادویہ کے قاطع حم الدم تعل کی جانچ پڑتال (Animal Models for Evaluation of Hypolipidemic Activity)	Yes	Yes	Yes
8	**(U-8)** حیوانات میں مواد ادویہ کے دافع اضطراب، دافع وحشت، دافع سنج، مخدر اور منوم تعل کی جانچ پڑتال (Animal Models for Evaluation of Anti-anxiety, Anti-depressant, Anticonvulsant, Sedative and Hypnotic Activity)	Yes	Yes	Yes
9	**(U-9)** حیوانات میں مواد ادویہ کے قوی نفسانیہ پر اثر پذیری کی جانچ پڑتال (Animal Models for Evaluation of Effect of Drug on Cognitive Function)	Yes	Yes	Yes
(M- 8) تحقیقاتی رپورٹ اور سائنسی وعلمی تحریر (Scientific Writing and Research Reporting) (Marks: Range 5-20)				
1	**(U-1)** حیوانات پر ریسرچ وتحقیق کے تجرباتی مناہج (Experimental Design for Animal Research)	Yes	Yes	Yes
2	**(U-2)** پری پیئر کے رھنماء اصول (PREPARE Guidelines)	Yes	Yes	No
3	**(U-3)** ارائیو کے رھنماء اصول (ARRIVE Guidelines)	Yes	Yes	No
4	**(U-4)** سرقہ، اشاعتی اخلاقیات، کوپ کے رھنما اصول (Plagiarism, Publication Ethics, COPE Guidelines, and ICMJE Recommendations)	No	Yes	No

6 G : Instruction for the paper setting & Blue Print for Summative assessment (University Examination)

Instructions for the paper setting.

1. 100 marks question paper shall contain:-
• Application Based Question: 1 No (carries 20 marks)
• Short Answer Questions: 8 Nos (each question carries 05 marks)
• Long Answer Questions: 4 Nos (each question carries 10 marks)
2. Questions should be drawn based on the table 6F.
3. Marks assigned for the module in 6F should be considered as the maximum marks. No question shall be asked beyond the maximum marks.
4. Refer table 6F before setting the questions. Questions should not be framed on the particular unit if indicated “NO”.
5. There will be a single application-based question (ABQ) worth 20 marks. No other questions should be asked from the same module where the ABQ is framed.
6. Except the module on which ABQ is framed, at least one Short Answer Question should be framed from each module.
7. Long Answer Question should be analytical based structured questions assessing the higher cognitive ability.
8. Use the Blueprint provided in 6G or similar Blueprint created based on instructions 1 to 7

Blueprint		
Question No	**Type of Question**	**Question Paper Format**
Q1	**Application based Questions** 1 Question 20 marks All compulsory	M1.U4 **Or** M1.U5 **Or** M1.U6 **Or** M2.U2 **Or** M3.U2 **Or** M3.U3 **Or** M4.U1 **Or** M4.U2 **Or** M4.U3 **Or** M4.U4 **Or** M4.U5 **Or** M5.U1 **Or** M5.U2 **Or** M5.U3 **Or** M5.U4 **Or** M5.U5 **Or** M6.U1 **Or** M6.U2 **Or** M6.U3 **Or** M6.U4 **Or** M6.U5 **Or** M6.U6 **Or** M7.U1 **Or** M7.U2 **Or** M7.U3 **Or** M7.U4 **Or** M7.U5 **Or** M7.U6 **Or** M7.U7 **Or** M7.U8 **Or** M7.U9 **Or** M8.U1 **Or** M8.U2 **Or** M8.U3
Q2	**Short answer Questions** Eight Questions 5 Marks Each All compulsory	1. M1.U1 **Or** . M1.U2 **Or** . M1.U3 **Or** . M1.U4 **Or** . M1.U5 **Or** . M1.U6 2. M2.U1 **Or** . M2.U2 **Or** . M2.U3 **Or** . M2.U4 3. M3.U1 **Or** . M3.U2 **Or** . M3.U3 **Or** . M3.U4 4. M4.U1 **Or** . M4.U2 **Or** . M4.U3 **Or** . M4.U5 **Or** . M4.U4 5. M5.U1 **Or** . M5.U2 **Or** . M5.U3 **Or** . M5.U4 **Or** . M5.U5 6. M6.U1 **Or** . M6.U2 **Or** . M6.U3 **Or** . M6.U4 **Or** . M6.U5 **Or** . M6.U6 7. M7.U1 **Or** . M7.U2 **Or** . M7.U3 **Or** . M7.U4 **Or** . M7.U5 **Or** . M7.U6 **Or** . M7.U8 **Or** . M7.U7 **Or** . M7.U9 8. M8.U1 **Or** . M8.U2 **Or** . M8.U3 **Or** . M8.U4
Q3	**Analytical Based Structured Long answer Questions** Four Questions 10 marks each All compulsory	1. M1.U3 **Or** . M1.U4 **Or** . M1.U5 **Or** . M1.U6 **Or** . M2.U2 2. M3.U1 **Or** . M3.U2 **Or** . M3.U3 **Or** . M4.U1 **Or** . M4.U2 **Or** . M4.U3 **Or** . M4.U4 **Or** . M4.U5 3. M5.U1 **Or** . M5.U2 **Or** . M5.U3 **Or** . M5.U4 **Or** . M5.U5 **Or** . M6.U1 **Or** . M6.U2 **Or** . M6.U3 **Or** . M6.U4 **Or** . M6.U5 **Or** . M6.U6 4. M7.U1 **Or** . M7.U2 **Or** . M7.U3 **Or** . M7.U4 **Or** . M7.U5 **Or** . M7.U6 **Or** . M7.U7 **Or** . M7.U8 **Or** . M7.U9 **Or** . M8.U1

6 H : Distribution of Practical Exam (University Examination)

S.No	Heads	Marks
1	**Long case or procedure/Major practical (any one) (80 Marks)**	80

	1. Qualitative tests for different secondary metabolites 2. Preparation of a Protocol for accelerated stability study 3. Standardization of different dosage forms of Advia Murakkaba 4. Determination of Ash values 5. Determination of the percentage of volatile oil in Drugs 6. Determination of Moisture content 7. Evaluation of the analgesic effect of a Unani drug against thermal and chemical nociceptive stimuli using simulated software.	
2	**Components such as short case or procedure or minor practical or spotters etc., (any one) (60 Marks)** 1. Identification of instrument (s) used to standardize crude drugs. 2. Thin-layer chromatography of the given extract. 3. Determination of the Extractive values of a given drug in different Solvents. 4. Calculation of the dose of a drug for rats, rabbits, mice, and guinea pigs by the body surface area conversion method. 5. Physiological salt solution • Importance • Composition and types • Preparation of Tyrode solution of the required concentration and pH. 6. Preparation of a protocol to evaluate the analgesic effect of an Unani drug following the PREPARE guidelines. 7. Framing an experimental design to screen an anti-inflammatory Unani drug using software. 8. Evaluation of a manuscript based on *in vivo* experiments in the light of ARRIVE Guidelines.	60
3	Viva (2 examiners: 20 marks/each examiner)	40
4	Logbook (Activity record)	10
5	Practical/Clinical Record	10
Total Marks		**200**

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Abbreviations

Domain		T L Method		Level	
CK	Cognitive/Knowledge	L	Lecture	K	Know
CC	Cognitive/Comprehension	L&PPT	Lecture with PowerPoint presentation	KH	Knows how
CAP	Cognitive/Application	L&GD	Lecture & Group Discussion	SH	Shows how
CAN	Cognitive/Analysis	L_VC	Lecture with Video clips	D	Does
CS	Cognitive/Synthesis	REC	Recitation		
CE	Cognitive/Evaluation	SY	Symposium		
PSY-SET	Psychomotor/Set	TUT	Tutorial		
PSY-GUD	Psychomotor/Guided response	DIS	Discussions		
PSY-MEC	Psychomotor/Mechanism	BS	Brainstorming		
PSY-ADT	Psychomotor Adaptation	IBL	Inquiry-Based Learning		
PSY-ORG	Psychomotor/Origination	PBL	Problem-Based Learning		
AFT-REC	Affective/ Receiving	CBL	Case-Based Learning		
AFT-RES	Affective/Responding	PrBL	Project-Based Learning		
AFT-VAL	Affective/Valuing	TBL	Team-Based Learning		
AFT-SET	Affective/Organization	TPW	Team Project Work		
AFT-CHR	Affective/ characterization	FC	Flipped Classroom		
		BL	Blended Learning		
		EDU	Edutainment		
		ML	Mobile Learning		
		ECE	Early Clinical Exposure		
		SIM	Simulation		
		RP	Role Plays		
		SDL	Self-directed learning		
		PSM	Problem-Solving Method		
		KL	Kinaesthetic Learning		
		W	Workshops		
		GBL	Game-Based Learning		
		LS	Library Session		

		PL	Peer Learning		
		RLE	Real-Life Experience		
		PER	Presentations		
		D-M	Demonstration on Model		
		PT	Practical		
		X-Ray	X-ray Identification		
		CD	Case Diagnosis		
		LRI	Lab Report Interpretation		
		DA	Drug Analysis		
		D	Demonstration		
		D-BED	Demonstration Bedside		
		DL	Demonstration Lab		
		DG	Demonstration Garden		
		FV	Field Visit		
		JC	Journal Club		
		Mnt	Mentoring		
		PAL	Peer Assisted Learning		
		C_L	Co Learning		