Drug Discovery and Medicinal Chemistry

Short Course Outline

	TOPIC	Description
1	Overview, Orientation of students.	♦ Course outline, delivery mode, staff introduction, scope of training,Pre-test.
2	Drug Discovery Process	♦ Selecting a disease, pre-clinical research, clinical trials & approval ♦ Drug costs & failure, intellectual property, module review
3	Drug Targets	♦ Protein structure, enzymes & inhibitors, receptors & ligands, potency & binding, efficacy, Module review
4	Drug Metabolism and Pharmacokinetics	♦ Therapeutic window & ADME, exposure & bioavailability, ♦ Metabolic reactions, clearance & distribution, controlling CL & Vd, Module review.
5	Lead Discovery and Optimisation	♦ Finding hits, lead selection, structure-activity relationships, ♦ ADME optimization, Toxicity, Module review
6	Case Studies from Literature	♦ Case study 1, Case study 2

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7	Special topic 1: Structure-guided Drug Design (SGDD)	♦ Overview of Structure-guided drug design ♦ Application of SGDD in hit identification, maturation and lead optimization. ♦ SGDD Workflows and examples ♦ SGDD Tools and Methods.
8	Special Topic 2: Computation and Artificial Intelligence in Drug Discovery	♦ General Evolution of Computer Technology and Usage ♦ Scientific Computing ♦ Machine Learning and Artificial Intelligence in Drug Discovery ♦ Example of ML/AI Enabled Drug Discovery ♦ Role of Computing in Different Stages of the Drug Discovery Pipeline ♦ Current Challenges
10	Special Topic 3: Drug Repurposing	♦ Overview of Drug Repurposing ♦ Strategies and approaches to repurpose existing medicines for new indications. ♦ Examples of Medicine Repurposing
11	Special Topic 4: Herbal Medicine Integration into Modern Drug Discovery (Cross-taught	♦ Definition of Class of Herbal Medicines ♦ Analysis of Complex Natural Products. ♦ Methodologies for formal evaluation of herbal medicines.

	with Herbal Medicines Module)	♦ Examples of successful transformation of herbal medicines into conventional medicines.
12	Special Topic 5: Non-small molecule therapies	<u>Peptide Therapies:</u> ♦ Overview ♦ Advantages, Disadvantages and Challenges ♦ Discovery, Development and Manufacturing <u>Nucleic Acid Therapies:</u> ♦ Overview ♦ RNA Therapies ♦ DNA/Genetic Therapies ♦ Challenges <u>Cell Therapies:</u> ♦ Overview ♦ Cell Engineering ♦ Cell Product Manufacturing ♦ Administration and Treatment Facilities.
<u>13</u>	Field Trip	♦ UVRI or Makerere
14	Assessment of the modules	♦ Knowledge Test ♦ Project Presentation