Drug Repurposing and Advanced Screening Techniques Training Course

Professional Development Training Course Outline

Category	Biotechnology and Pharmaceutical Development	**Duration**	10 Days
Base Fee	$4,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The landscape of drug discovery is undergoing a profound digital transformation, moving past traditional, high-risk methodologies toward more efficient and cost-effective strategies. Drug Repurposing is an innovative strategy that leverages existing, approved, or investigational compounds to accelerate the identification of new therapeutic uses, drastically reducing time and cost to market. This approach is critical for tackling urgent public health needs, such as pandemics, and addressing rare and neglected diseases. Successful repurposing hinges on the mastery of Advanced Screening Techniques, which now rely heavily on the convergence of data science, bioinformatics, and pharmacology to analyze complex datasets and predict drug-target interactions with unprecedented accuracy.

Drug Repurposing and Advanced Screening Techniques Training Course provides participants with comprehensive knowledge and practical skills to lead the next generation of pharmaceutical innovation. We focus on integrating cutting-edge technologies like Artificial Intelligence (AI), High-Throughput Screening (HTS), and advanced phenotypic screening to identify promising drug candidates efficiently. Participants will learn to navigate the complete repurposing pipeline, from in-silico hypothesis generation using Machine Learning and Virtual Screening to experimental validation with High-Content Screening (HCS) and 3D cell culture models (e.g., Organoids). By mastering these techniques, professionals will be empowered to unlock the hidden potential of existing molecules, drive ROI on existing assets, and deliver faster, lower-risk solutions for patient care, thereby accelerating the entire R&D pipeline.

Programme Curriculum

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Introduction

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Course Duration

10 days

Course Objectives

Upon completion of this course, participants will be able to:

1. Comprehend the foundational principles of Drug Repurposing and its strategic advantages in the Modern Pharmaceutical Industry.
2. Apply advanced High-Throughput Screening (HTS) and High-Content Screening (HCS) methodologies for large-scale compound analysis.
3. Utilize Computational Drug Discovery and AI/Machine Learning to predict novel Drug-Target Interactions and repurposing hypotheses.
4. Design and validate robust biochemical and cell-based screening assays, mastering the use of Z'-factor for data quality.
5. Master the application of Virtual Screening techniques, including Molecular Docking and Pharmacophore Modeling.
6. Integrate Deep Learning models for predicting molecular activity and optimizing hit-to-lead development.
7. Implement Phenotypic Screening strategies using 3D Cell Culture, Organoids, and Organ-on-a-Chip technologies.
8. Evaluate the use of Fragment-Based Drug Discovery (FBDD) and DNA-Encoded Libraries (DEL) in identifying repurposing candidates.
9. Analyze and interpret complex HTS data, effectively mitigating issues like Assay Interference (PAINS) and false positives.
10. Formulate a successful drug repurposing strategy, from IP and Patent Extension to Pre-clinical and Clinical Trial Design.
11. Leverage Real-World Evidence (RWE) and Big Data Analytics to support and validate new therapeutic indications.

12. Address the Regulatory and Ethical Considerations for repurposed drugs in compliance with global standards
13. Drive Accelerated Drug Development to address Unmet Medical Needs and public health crises

Target Audience

1. Pharmaceutical and Biotechnology Scientists (R&D, Discovery, Preclinical).
2. Computational Chemists and Bioinformaticians looking to apply ML/AI models.
3. Research Scientists and Lab Managers responsible for HTS/HCS operations.
4. Academics and Postdoctoral Researchers focused on drug discovery projects.
5. R&D Strategy and Portfolio Managers seeking low-risk development strategies.
6. Regulatory Affairs Professionals.
7. Venture Capitalists and Business Development personnel in the Life Sciences.
8. Toxicology and Safety Assessment Scientists leveraging existing PK/PD data.

Course Modules

Module 1: Strategic Foundations of Drug Repurposing

- The Drug Repositioning Paradigm.
- Cost-saving advantages, reduced timelines, and improved success rates.
- Overview of 505(b)(2) and orphan drug designation for repurposing.
- Strategies for securing new intellectual property and market exclusivity.
- Case Study: Sildenafil (Viagra) From Angina Treatment to Erectile Dysfunction.

Module 2: High-Throughput Screening (HTS) Mastery

- Target identification, assay design, and library selection strategies.
- Principles of signal-to-noise ratio, Z'-factor, and quality control metrics.
- Use of robotic systems and liquid handlers for high-density plates.
- Principles of Fluorescence, Luminescence, FRET, and AlphaScreen assays.
- Case Study: Role of HTS in the Discovery of an Antiviral Drug for a Global Pandemic

Module 3: High-Content and Phenotypic Screening

- Image acquisition, multi-parametric analysis, and automated microscopy.
- Target-agnostic discovery for complex disease mechanisms.
- Utilizing Organoids, Spheroids, and 3D Cell Culture for physiologically relevant assays.
- Segmentation, feature extraction, and machine learning for image-based hits.
- Case Study: Repurposing for Alzheimer's Disease using patient-derived iPSC and Organoid models.

Module 4: Computational Drug Repurposing (In Silico)

- Mining Public Databases and proprietary clinical data.
- Analyzing drug effects on complex biological networks and pathways.
- Using transcriptomic signatures to link drugs and diseases.
- Overview of chemical similarity and protein structure tools.
- Case Study: Atazanavir HIV Protease Inhibitor Repurposed via Network Analysis for a new indication.

Module 5: Virtual Screening and Molecular Docking

- Algorithms, scoring functions, and conformation search strategies.

- Practical training on open-source and commercial packages.
- Techniques for creating and managing diversity and focused libraries.
- Identifying and mapping essential chemical features for binding.
- Case Study: Thalidomide Re-evaluating an Old Drug with Molecular Docking for new anti-cancer indications.

Module 6: AI and Machine Learning in Repurposing

- Supervised, unsupervised learning, and model validation
- Applications of CNNs for structural analysis and Graph Neural Networks for biological networks.
- Descriptors, fingerprints, and molecular properties for predictive models.
- Using ML to forecast Absorption, Distribution, Metabolism, Excretion, and Toxicity.
- Case Study: Baricitinib COVID-19 treatment identified through Deep Learning-based screening.

Module 7: Fragment-Based Drug Discovery (FBDD)

- Screening small, low molecular weight fragments to build high-affinity leads.
- Use of NMR, X-ray Crystallography, and SPR for fragment binding detection.
- Strategies for fragment evolution into potent lead compounds.
- Using fragment hits to uncover novel binding sites on existing targets.
- Case Study: Vertex Pharmaceuticals & VX-770 Discovery via Fragment-Based approach.

Module 8: DNA-Encoded Libraries (DEL)

- Principles of DNA-encoded chemistry and library creation
- Screening vast libraries against a target protein.
- Next-Generation Sequencing (NGS) and data analysis for identifying binders.
- Rapidly identifying novel chemotypes that bind to repurposed targets.
- Case Study: A recent example of a novel DEL-derived inhibitor moved to preclinical stages.

Module 9: Data Management and Informatics

- Standardizing and integrating diverse data types
- Identifying and mitigating data noise, outliers, and the PAINS issue.
- Best practices for lab informatics management.
- Data normalization, error analysis, and robust hit selection.
- Case Study: Implementing Genedata Screener for a large-scale HTS campaign.

Module 10: Clinical and Regulatory Strategy

- Phase II and III design tailored for repositioned drugs.
- Leveraging existing PK/PD data to expedite trials.
- Filing an NDA/MAA for a new indication.
- Integrating patient voice and advocacy groups, especially for rare diseases.
- Case Study: Cysteamine Repurposed for Cystic Fibrosis using patient-informed formulation strategy.

Module 11: Real-World Evidence (RWE) and Observational Data

- Electronic Health Records (EHRs), claims data, and patient registries.
- Methodologies for establishing drug efficacy from observational data.
- Strategies for mitigating methodological challenges in RWE studies.
- Current FDA/EMA guidance on using RWE to support repurposing.

- Case Study: Using EHR data to support the repurposing of a hypertension drug for Alzheimer's.

Module 12: Application for Rare and Neglected Diseases

- Criteria and financial/regulatory incentives.
- Small patient populations, lack of animal models, and limited funding.
- Focus on oncology, infectious diseases, and neurodegeneration.
- Role of non-profits, academia, and open-source data platforms.
- Case Study: Alkaptonuria Successful repurposing journey for a rare genetic disorder.

Module 13: IP, Licensing, and Commercialization

- Navigating existing patents and compound use rights.
- Securing rights to abandoned or shelved compounds.
- Market assessment, pricing, and access strategies.
- Pitching repurposing projects to VCs and government grants.
- Case Study: The successful licensing and commercial path of Thalidomide's re-emerged uses.

Module 14: Emerging Screening Technologies

- Microfluidics and Organ-on-a-Chip.
- Functional genomics for target identification and validation.
- Using small molecules to perturb biological pathways non-genetically.
- Nanotechnology in Drug Delivery.
- Case Study: Utilizing Organ-on-a-Chip technology for rapid toxicity screening of repurposed drugs.

Module 15: Future of Accelerated Drug Discovery

- Generative AI for Novel Design:
- Cloud-Based Screening Platforms.
- Translational Science.
- Addressing patient access, pricing, and equitable use of repurposed drugs.
- Case Study: Examining the REMEDi4ALL consortium's model for revolutionizing the end-to-end repurposing journey.

Training Methodology

The course employs a blended, immersive learning approach to ensure both theoretical mastery and practical application of advanced concepts.

1. Interactive Lectures & Discussions.
2. Practical Workshops/Lab Simulations
3. Real-World Case Studies & Analysis.
4. Computational Hackathons.
5. Capstone Project/Repurposing Proposal.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call +254769199797

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now