



Universidade Federal
de São João del-Rei

UNIVERSIDADE FEDERAL DE SÃO JOÃO DEL-REI – UFSJ
INSTITUÍDA PELA LEI Nº 10.425, DE 19/04/2002 – D.O.U. DE 22/04/2002
PRÓ-REITORIA DE PESQUISA E PÓS-GRADUAÇÃO – PROPE

CURSO: Programa Multicêntrico de Bioquímica e Biologia Molecular			
Nível: Mestrado/Doutorado			
Ano/Semestre: 2024/2			
Docente(s) Responsável(is): Rosy Lara Maciel de A. Ribeiro e Rony Abdi Syahputra			
Formato: () Presencial () Remoto (X) Híbrido (presencial + remoto)			
INFORMAÇÕES BÁSICAS			
Unidade curricular Tópicos Especiais em Bioquímica II: Advanced Pharmacotherapy and Research Methodologies			Departamento CCO – Dona Lindu
Carga Horária			Código SIGAA PMBQBM0078
Teórica 16 horas	Prática 14 horas	Total 30 horas	
Tipo Optativa	Habilitação / Modalidade Mestre/Doutor em Bioquímica e Biologia Molecular		Pré-requisito The student must be able to understand and respond in English.
Área de Concentração: Bioquímica e Biologia Molecular			

EMENTA	
Estudos avançados e atualizados de um tema específico no campo da Bioquímica, visando a formação complementar teórica e/ou prática do estudante de mestrado e/ou doutorado do PMBqBM.	
OBJETIVOS	
This course provides an in-depth exploration of pharmacotherapy in cardiovascular diseases and cancer, along with comprehensive training in bioassays, research methodologies, manuscript writing, pharmacology, toxicology, molecular docking, and network pharmacology. This course aims to equip students with advanced knowledge and practical skills essential for conducting high-quality research and contributing to the field of pharmacology.	
CONTEÚDO PROGRAMÁTICO	
Module 1: Bioassay	
Description: This module focuses on the principles and applications of bioassays, which are experimental procedures that measure the effects of a substance on a living organism or cell. Students will learn various bioassay techniques, including in vitro and in vivo assays, and how to interpret and analyze bioassay data. Practical sessions will provide hands-on experience in conducting bioassays for drug development and toxicity testing.	
Module 2: Pharmacotherapy in Cardiovascular Diseases	



Description: This module covers the pharmacological treatment of cardiovascular diseases. It includes the study of drug actions, mechanisms, therapeutic uses, and adverse effects of medications used to treat conditions such as hypertension, heart failure, and arrhythmias. Emphasis is placed on understanding the latest advancements in cardiovascular pharmacotherapy and personalized medicine approaches.

Module 3: Pharmacotherapy in Cancer

Description: This module explores the pharmacological approaches to cancer treatment. Topics include the mechanisms of action of anticancer drugs, chemotherapy, targeted therapy, immunotherapy, and the management of drug resistance. Students will also learn about the latest research developments in cancer pharmacotherapy and the design of effective treatment regimens.

Module 4: Methodology of Research

Description: This module provides a comprehensive overview of research methodologies, including experimental design, data collection, statistical analysis, and interpretation of research findings. Students will learn how to formulate research questions, develop hypotheses, and design robust experiments. The module also covers ethical considerations in research and the principles of good laboratory practice.

Module 5: Manuscripts Writing

Description: This module focuses on the skills needed for writing scientific manuscripts. Students will learn the structure and components of a scientific paper, including abstract, introduction, methods, results, discussion, and references. The module will provide guidelines on how to effectively communicate research findings, adhere to journal requirements, and navigate the peer review process.

Module 6: Pharmacology and Toxicology

Description: This module delves into the principles of pharmacology and toxicology. It covers the pharmacokinetics and pharmacodynamics of drugs, drug interactions, and the adverse effects of chemicals and pharmaceuticals. Students will learn about the toxicological assessment of substances and the regulatory framework governing drug safety and approval.

Module 7: Molecular Docking and Network Pharmacology

Description: This module introduces students to molecular docking and network pharmacology, two powerful tools in drug discovery and development. Molecular docking involves the computational prediction of how small molecules, such as drugs, interact with target proteins. Network pharmacology explores the complex interactions between drugs, targets, and biological pathways. Students will gain hands-on experience with software tools and databases used in these fields, and learn how to apply these techniques to identify potential drug candidates and therapeutic targets.

Note: It will be offered online and in person.



CRITÉRIOS DE AVALIAÇÃO

- **Seminars:** Interactive sessions to discuss recent advancements and case studies.
- **Assignments:** Written assignments and projects to reinforce learning.
- **Exams:** Assessments to evaluate understanding and application of course material.

BIBLIOGRAFIA BÁSICA

Hydrobiologia 188/189: 5-20, 1989. M. Munawar, G. Dixon, C. I. Mayfield, T. Reynoldson and M. H. Sadar (eds) 5 Environmental Bioassay Techniques and their Application. © 1989 Kluwer Academic Publishers. Printed in Belgium. The scientific basis of bioassays John Cairns, Jr.I & James R. Pratt2

Syahputra RA, Harahap U, Harahap Y, Gani AP, Dalimunthe A, Ahmed A, Zainalabidin S. Vernonia amygdalina Ethanol Extract Protects against Doxorubicin-Induced Cardiotoxicity via TGF β , Cytochrome c, and Apoptosis. *Molecules*. 2023 May 24;28(11):4305. doi: 10.3390/molecules28114305. PMID: 37298779; PMCID: PMC10254146.

Atanasov AG, Zotchev SB, Dirsch VM; International Natural Product Sciences Taskforce; Supuran CT. Natural products in drug discovery: advances and opportunities. *Nat Rev Drug Discov*. 2021 Mar;20(3):200-216. doi: 10.1038/s41573-020-00114-z. Epub 2021 Jan 28. PMID: 33510482; PMCID: PMC7841765.

Kiani AK, Naureen Z, Pheby D, Henehan G, Brown R, Sieving P, Sykora P, Marks R, Falsini B, Capodicasa N, Miertus S, Lorusso L, Dondossola D, Tartaglia GM, Ergoren MC, Dundar M, Michelini S, Malacarne D, Bonetti G, Donato K, Medori MC, Beccari T, Samaja M, Connelly ST, Martin D, Morresi A, Bacu A, Herbst KL, Kapustin M, Stuppia L, Lumer L, Farronato G, Bertelli M; INTERNATIONAL BIOETHICS STUDY GROUP. Methodology for clinical research. *J Prev Med Hyg*. 2022 Oct 17;63(2 Suppl 3):E267-E278. doi: 10.15167/2421-4248/jpmh2022.63.2S3.2769. PMID: 36479476; PMCID: PMC9710407.

BIBLIOGRAFIA COMPLEMENTAR

Course Outcomes:

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

1. Conduct bioassays and interpret experimental results.
2. Apply advanced pharmacotherapy principles in the treatment of cardiovascular diseases and cancer.
3. Design and execute robust research studies with appropriate methodologies.
4. Write and submit scientific manuscripts to peer-reviewed journals.
5. Understand the principles of pharmacology and toxicology, including drug safety assessments.
6. Utilize molecular docking and network pharmacology techniques in drug discovery.