Bachelor of Science (Honours) in Pharmacology

Course overview:

Pharmacology is the study of all aspects of medicines, including how they are developed, analysed, tested for their safety and effectiveness, administered, their beneficial and adverse effects, together with all aspects concerning their research. The degree course brings together the biological, biotechnological and digital aspects of pharmacology, and equips you with the required skills as recommended by both International Pharmacology associations and major European Universities, whilst keeping in focus the needs of the local and international industry.

The curriculum is structured as follows:

Year 1 provides a solid basis of the required physiology, molecular biology, genetics and statistics, which is required to benefit from the rest of the course. It also lays the foundations for pharmacokinetics, pharmacodynamics, drug formulations, drug development, regulatory issues, routes of drug administration, molecular pharmacology, pharmacotherapeutics, pharmacogenetics and pharmacogenomics.

Year 2 delivers a sound knowledge of all the major drugs and drug classes, their modes of action and their application in the respective therapeutic fields. This year also provides students with practical laboratory bench teaching and training in various skills of molecular pharmacology research, such as cell culturing, drug assays, cellular transfection etc.

Year 3 introduces Pharmacotoxicology and toxicogenomic aspects, as well as the innovative fields of digital therapeutics and of computational drug design. You will prepare your dissertation during this year, further contributing to the acquisition of a skill set which is transferable to the employment sector.

Learning outcomes:

a) Subject knowledge and understanding

Upon completion of the course, you will be able to:

• Explain the various mechanisms of drug actions at a molecular level.

• Discuss the various pharmacological drug classes with their clinical applications, and modes of action.

• Describe and evaluate the relevance of different routes of drug administration, within the context of different medicine formulations and patient-specific factors.

• Describe the principles of drug pharmacokinetics and pharmacodynamics, in terms of their theoretical aspects and practical applications.

• Explain the various actions of biotherapeutic pharmacological agents (e.g. antibodies, vaccines), their use, and how these drugs differ from conventional small molecular therapeutic compounds from manufacturing, structural and mechanistic aspects.

• Describe the various existing approaches to gene therapy, their benefits and risks, and the current status of this technological approach in view of the outcomes of clinical trials carried out to date.

• Recognise and integrate the several factors that influence the benefit to risk ratio in drug use, keeping in perspective major issues such as therapeutic efficacy, adverse drug reactions, drug-drug and drug-food interactions, mode of drug administration and pharmacoeconomic aspects.

• Illustrate the various stages in drug development.

• Discuss the approaches to digital therapeutics, and their integration within current evidence-based therapeutic guidelines.

• Assimilate the importance of pharmacogenetics and pharmacogenetics and apply this to practical situations in clinical therapeutics.

• Obtain a theoretical and lab bench-based practical training of major research experimental pharmacological approaches, including in vitro and in vivo pharmacological models and techniques.

• Discuss various experimental analysis approaches to clinical and molecular pharmacology aspects, such as clinical therapeutic drug monitoring, laboratory cell-based pharmacology end-point measurements etc.

• Identify suitable bioinformatics and computational approaches to relevant pharmacology areas.

• Recognise and apply proper ethical standards to clinical and animal-based research.

• Comprehend the regulatory framework within which medicines are, to actual situations in a work environment.

• Disseminate scientific knowledge and research through oral conference-type presentations and seminars, as well as posters.

• Provide properly sourced and relevant drug and poisons information to medical, scientific and lay people.

• Discuss aspects in Pharmacotoxicology, within a molecular and clinical framework, incorporating areas which include predictive toxicogenomic principles, intentional and accidental drug toxicity, drug identification in Pharmacotoxicology, use of antidotes etc.

b) Intellectual development:

Upon completion of the course, you will be able to:

• Integrate different pharmacological aspects of drugs in order to provide well-informed drug-related advice in their work environments.

• Critically discuss issues related to several facets of drug use, and use learned knowledge as a stepping stone to expand their understanding on new drugs as they reach the market.

• Apply different research models and research experiments to address a pharmacology question.

• Discriminate reviewed and reliable scientific information sources from predatory journals and miscellaneous information providers.

• Keep abreast with new developments in the field.

• Recognise and apply proper ethical standards to clinical and animal-based research.

• Apply the training obtained in medicines regulations, to actual situations in a work environment.

c) Key/Transferable skills

Upon completion of the course, you will be able to:

• Successfully and competently position yourself to provide advice related to pharmacology within a variety of work environments.

• Be able to assess benefits and risks.

• Apply basic statistical analysis skills to research applications and other work environments.

• Apply and adapt the learned laboratory skills and research approaches to different work environments.

• Apply pharmacological knowledge and skills to problem-solving approaches in therapeutics.

• Source and evaluate relevant information from official repositories in order to address real-life situations, compile scientific reports etc.

• Work independently and also within a multidisciplinary team.

• Communicate effectively to scientific and non-scientific audiences.

• Use task and time management skills.

d) Other skills relevant to employability and personal development

Upon completion of the course, you will be able to:

• Advise on drug development, regulatory issues, research activities, quality control etc, and apply these within a broader context extending for example to industrial chemicals, toxicological aspects, chemical safety, etc.

• Apply ethical principles to drug research and other related activities.

• Use the equipment in a laboratory effectively.

• Communicate effectively, verbally and in writing, on issues related to pharmacology and related scientific areas.

• Advise on cost-effective pharmacological management

• Participate in pharmacovigilance activities and adverse drug reaction reporting

• Interact effectively in a team as well as build international contacts.

• Self-assess their performance and partake in continual professional development.

• Productively engage in drug-related knowledge and healthcare activities.

• Assume managerial roles within the health sciences sector.