Name of the Program: M.Sc. Marine Microbiology
Course Code: MMI-618
Title of the Course: Marine Drug Development and Metabolism
Number of Credits: 01
Effective from AY: 2022 - 23

Prerequisites for the course:	Students should have undergone M.Sc. Marine Microbiology/Marine Biotechnology Semester III Courses.	
Objective:	To introduce the concepts of clinical research for drug development, drug administration and metabolism.	
Content:	**Module I** Marine drug discovery and development. Comprehensive Marine Natural Product Database (CMNPD). docking studies. Preclinical and clinical research. FDA review. FDA post-market safety monitoring. Marine pharmacology: antibacterial, antiviral, anti-inflammatory, antiparasitic, neuroprotective, anticancer, analgesic, antimicrobial, anti-malarial and nutraceutical. Marine drugs in clinical phase trials. Approved drugs of marine origin (Cytarabine, Vidarabine). Routes of drug administration. Biotransformation and metabolism. Factors affecting biotransformation.	15 hrs.
Pedagogy:	Lectures/ assignments/ students' seminars/ interactive learning.	
References/ Readings:	1. Lyu, C., Chen, T., Qiang, B., Liu, N., Wang, H., Zhang, L., & Liu Z. (2021). CMNPD: a comprehensive marine natural products database towards facilitating drug discovery from the ocean. *Nucleic Acids Research*. 49, D509-D515. *doi: 10.1093/nar/gkaa763.* 2. Paradkar, A. R., & Bakliwal, S. R. (2006). *Biopharmaceutics and pharmacokinetics*. Pune: Nirali Prakashan. 3. Shargel, L., & Yu, A. B. C. (2015). *Applied biopharmaceutics & pharmacokinetics*. (Seventh Edition), New Delhi: Tata Mc Graw Hill Publishing Company. 4. Brahmankar, D. M., & Jaiswal, S. B. (2015). *Biopharmaceutics and pharmacokinetics – a treatise*. (Third Edition), Delhi: Vallabh Prakashan. 5. Schoenwald, R.D. (2009). *Pharmacokinetics in drug discovery and development*. CRC Press. Boca Raton. 6. Chakraborty, C., & Bhattacharyya, A. (2004). *Pharmacogenomics An approach to new drug development*. Delhi: Biotech Books. 7. Lodola, A., & Stadler, J. (2011). *Pharmaceutical toxicology in practice: a guide for non-clinical development*. New	

	Jersey: John Wiley & Sons. *8.* Differding, E. (2017). The drug discovery and development industry in India – two decades of proprietary small-molecule R&D. *ChemMedChem Reviews*. 12, 786-818. *doi:10.1002/cmdc.201700043.*	
Course Outcomes:	1. Describe the process of development of drug from a marine source. 2. Compare various biomolecules towards application in pharmacology. 3. Predict fate of any drug after administration in human body. 4. Apply the concept of drug development for planning bioprospecting studies.	