**MOLECULAR TOXICOLOGY CREDIT HOURS 2+1**

**LEARNING OUTCOMES:**

**Students will be able to gain**:

* + - 1. knowledge of current understanding, emerging issues and trends within the fields of molecular toxicology

**COURSE CONTENTS:**

History and basic concepts of toxicology, molecular and forensic basis of toxicology and its applications. Toxicological effects of various drugs of abuse and their action of mechanism. Sampling techniques and methodologies used to identify various toxicants. Insight of different types of poisons and toxicants, classification and their management, Identification of drugs in the body, Toxicity of pharmaceutical materials, non-medicinal agents and industrial pollutants, Targeted organ toxicity (Blood, Immune system, Heart, Liver, Kidney, Respiratory System, Nervous system, Ocular visual system, Endocrine system). Multiplicity and properties of drug-metabolizing enzymes (cytochrome P450, glutathione S-transferases and others), clinical and toxicological consequences of genetic polymorphisms of drug metabolizing enzymes, chemical and biological properties of reactive intermediates responsible for toxicity, mechanisms underlying idiosyncratic drug reactions (Identifying genetic risk factors for serious adverse drug reactions: current progress and challenges).

**PRACTICALS:**

1. Study of effect of various toxins in animal models
2. Study of effect of various toxins on DNA
3. Effect of toxins on different pathway (oxidative stress)
4. In-silico or computational approaches to predict drug metabolism and toxicity

**RECOMMENDED BOOKS:**

1. Dell'Omo,G., 2002. [Behavioural Ecotoxicology](http://eu.wiley.com/WileyCDA/WileyTitle/productCd-0471968528.html). John-Willey and Son Limited.
2. Fishbein, J. C. 2012. Advances in Molecular Toxicology. Burlington: Elsevier Science
3. Fowler, B. A. 2016. Molecular biological markers for toxicology and risk assessment. S.l.: Elsevier Academic Press.
4. Hodgson, E. A Textbook of Modern Toxicology. 2011. 4thEdition. Wiley.
5. Josephy, P. D. and Mannervik, B.,2006. Molecular Toxicology, 2ndEdition, Oxford University Press. ISBN: 9780195176209.
6. Keohavong, P. and Grant, S.G., 2005. Molecular Toxicology Protocols, 2ndEdition.. DOI:10.1007/978-1-62703-739-6, ISBN: 978-1-62703-738-9. Publisher: Humana.

Phouthone, K., and **Grant**, S, G.2016. Molecular Toxicology Protocols. Hamnna Press.