**GENETICALLY MODIFIED ORGANISMS CREDIT HOURS 2+1**

**LEARNING OUTCOMES:**

**Students will be able to:**

1. Know about mechanisms/ development of Genetically Modified Organisms
2. Learn the importance of GMOs to improve the desirable traits
3. Get awareness regarding the ethical concerns of GMOs.

**COURSE CONTENTS:**

Introduction to Genetically Modified Organisms (GMOs). Historical Background and Scientific foundations. Techniques for generation of GMOs, genetic transformation methods, nuclear and organelle transformation, selection markers, Micro-organisms (Bacteria, Yeast), Insects, Plants, Fish, mammals, Incorporation of Novel genes for tolerance against Biotic and Abiotic stresses, Genes for yield and quality improvement, Genes for Insect and disease Resistance. BT and RR crops and future concerns, Applications of GMOs, Bacteria-synthesized transgenic products ([Insulin](https://en.wikipedia.org/wiki/Insulin), [Hepatitis B vaccine](http://vaccine),[Tissue plasminogen activator](http://activator), [Human growth hormone](http://hormone), [Ice-minus bacteria](http://bacteria), [Interferon](https://en.wikipedia.org/wiki/Interferon), BT Cotton, Ethical issues and public concerns regarding GMOs. International and national regulations for GMOs.

**PRACTICALS:**

1. Methods of Transformation of various organisms
2. Identification of transient and stable transgenic expression

**RECOMMENDED BOOKS:**

1. Kemp Ken F, 2010. Genetic Modification of Plants: Agriculture, Horticulture and Forestry (Biotechnology in Agriculture and Forestry). Springer.
2. Mahgoub, S. E. O. 2016. Genetically modified foods: Basics, applications, and controversy. Boca Raton : CRC Press/Taylor & Francis Group.
3. Nelson, G. C. 2001. Genetically Modified Organisms in Agriculture**,**Academic Press Inc., U.S.A.
4. Piguet, P., & Poindron, P. 2012. Genetically modified organisms and genetic engineering in research and therapy. Basel: Karger

Watson, R. R., & Preedy, V. R. 2016. Genetically modified organisms in food: Production, safety, regulation and public health. Amsterdam: Elsevier Science.