Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Science
Department of Life Science
Generic Electives (GE) Under Graduate Courses

SEMESTER VI

COURSE CODE	Category	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTUGE06	**GE**	**Genetically Modified Organisms**	60	20	20	0	0	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment shall be based following components: Quiz / Assignment / Project/ Participation in Class, given that no component shall exceed more than 10 marks.**

Course Objectives:

1. Biotechnological methods for developing Genetically Modified Organisms (GMOs).
2. Genetic Engineering – current social status.

Course Outcomes

1. Understanding the science behind GMO's.
2. Benefits and risks of GMO's.

UNIT- I: Overview of GMOs

From domestication to DNA; Crop domestication and The Green Revolution; Food evolution; Conventional and bio-food; Plant genetic engineering: Status and methods; Brief overview of GMOs; Need for GMOs; How science works; Scientific consensus.

UNIT- II: Biology behind the GMOs

Genes, genomes and genetic engineering; Diversity of genetic modification methods; New biotechnological methods: Gene editing and basic methods to isolate and manipulate genes, and transfer them into plants, animals, and microbes; Genetically modified food of plant and animal origin; Genetically modified food- pros and cons.

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BTUGE06 Genetically Modified Organisms

UNIT- III: Successful and popular GMOs

Genetically modified plants and crops; Genetically modified medicines; Genetically modified animals; GMOs in commercial use, and on the horizon for use in the near to mid-term, including insect-resistant plants, herbicide-resistant crops, medicine-producing livestock, and growth enhanced fish, dietary supplements and the case of nitrite/ates; Modified agricultural practices; Deeper dive on animal biotechnology.

UNIT- IV: Challenges & Opportunities of GMOs

Environmental, health and ethical context of GMOs; Advantages of transgenic organisms; Risks associated with the creation of GMOs; Limitations of this science; Emergent and Persistent Problems; Biofortification; Potential hazards resulting from the consumption of genetically modified food by animals and the final consumer – human; How biotechnology intersects with globalization, trade, poverty, food security, and environmental sustainability.

UNIT- V: Politics and Society

Regulating GMOs; Law on GMOs; New food safety laws; Patents and intellectual property; Public vs. scientist credibility; Ethical values and perspectives; Reasons for ideological as well as legal and ecological concerns; Monsanto; The Papaya Puzzle; Forbidden Fruit; Cascade Effects; GMOs and you; Individual Choice.

BOOKS:

1. Desmond S. T. Nicholl (2008). An introduction to Genetic Engineering. (3rd Edition). Cambridge University Press.
2. Krimsky S. (2019). GMOs Decoded-A Skeptic's View of Genetically Modified Foods.
3. Parekh, Sarad R. (2004). The GMO Handbook: Genetically Modified Animals, Microbes, and Plants in Biotechnology. (1st Edition). Humana Press.
4. Watson R., Preedy V. (2015). Genetically Modified Organisms in Food. (1st Edition). Elsevier.

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