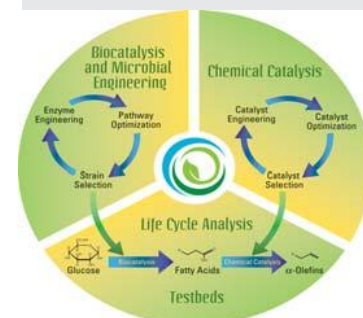


19BT101 BIOPRODUCTS AND BIOENTREPRENEURSHIP

Hours Per Week :

L	T	P	C
3	1	-	4



COURSE DESCRIPTION AND OBJECTIVES:

This course provides the gamut of Bioproducts and their market potential. It creates awareness on a wide array of biologically derived products. Further entrepreneurship opportunities in the arena of Bioproducts will be acquainted.

COURSE OUTCOMES:

Upon completion of the course, student will able to achieve the following outcomes:

COs	Course Outcomes
1	Understand the importance of Bioproducts and their applications.
2	Apply the knowledge for development of new Bioproducts for various purposes.
3	Develop new methods for the production of Bioproducts.
4	Evaluate the importance of green entrepreneurship.

SKILLS:

- ✓ Gain knowledge on various bioproducts.
- ✓ Evaluate the scope of Bioentrepreneurship.
- ✓ Recycle and reuse biowaste for high value compounds.
- ✓ Analyze Bioproducts market trend.

Source:

<https://www.cbirc.iastate.edu/research/>

Activities:	UNIT - I	L-9
o <i>Models on renewable energy like biofuels from food waste.</i>	INTRODUCTION TO BIOPRODUCTS: Definition of Bioproducts; Categories of Bioproducts; Importance of Bioproducts; Bioproducts industry - strategies and action plans, global trends and current situation; Bioproducts used for decoration; Biofertilisers; Examples of clonal propagation of plants; Horticulture plants, Bonsai plants; Socio-economic and environmental impact of Bioproducts.	
o <i>Case Studies on green entrepreneurship and start-ups.</i>	UNIT - II	L-9
	ENERGY RELATED BIOPRODUCTS: Liquid fuels - ethanol and biodiesel; Carbon neutrality; Conversion mechanisms; Solid biomass for combustion to generate heat and power; Gaseous fuel such as biogas; Renewable energy opportunities for Indian entrepreneurs.	
o <i>Case studies on market potential of enzymes, vaccines and monoclonal antibodies.</i>	UNIT - III	L-9
	BIOMATERIALS: Bioplastics from plant oils, Corn and sugars; Biofoams and biorubber from plant oils and latex; Biocomposites manufactured from agriculture (e.g., hemp, flax, kenaf) and forestry; Biofibres, Biopolymers.	
	UNIT - IV	L-9
	INDUSTRIAL RELATED BIOPRODUCTS: Industrial - basic and specific chemicals; Therapeutic antibodies, Enzymes, Hormones and vaccines; Antibiotics; Essential oils, Biorepellents - case study; Trichoderma, Bt cotton biopolymers; Biopigments and their commercial applications.	
	UNIT - V	L-9
	ENTREPRENEURSHIP RELATED TO BIOPRODUCTS: Entrepreneurship ecosystem and start-ups, Bioeconomy; Perception and analysis of green entrepreneurship ecosystem by its stakeholders; Green entrepreneurship - case studies; Bioproducts manufacturers and suppliers in India; GLP, GMP, Regulatory affairs, Start-ups.	

TEXT BOOKS:

1. N.T. Dunford, "Food and Industrial Bioproducts and Bioprocessing", Wiley-Blackwell publishers, 2012.
2. J.C. Philp and K.C. Pavanan, "Perspectives- bio-based Production in a Bioeconomy", Asian Biotechnology and Development Review, Vol. 15, No.2, pp 81-88, 2012.
3. W. Christoph and C.L James (Eds) "Industrial Biotechnology" Products and Process, 1st edition; 2016.

REFERENCE BOOKS:

1. J. W. Lee, "Advanced Biofuels and Bioproducts", Springer New York, 2013.
2. C. T. Hou and J.F. Shaw, "Biocatalysis and Bioenergy", Wiley publishers, 2008.
3. S. Wilfried, M. Bernd and W. Matthias, "Biotechnology of Natural Products", Springer, 2018.
4. K. Menka and S. Arpita, "Biotechnology Products in Everyday Life", Springer, 2019