Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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

SEMESTER IV

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*				
BTUG402	**GE**	**Bioenergy**	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. Introduction to Energy technologies using biomass.
2. Production of Energy from bio waste.

Course Outcome:

1. Understanding the process of Energy production from biological materials.
2. Application of bio energy techniques.
3. To Identify potential biomass feedstocks including energy crops;
4. To realise the significance of biofuels and bioenergy systems in our day to day life.

UNIT – I: Energy Resources

Types of Energy; Energy characteristics; Energy and Environment
Energy security

UNIT – II: Bioenergy concepts

Introduction of Bioenergy; Basics of Biomass technology
Biopower; Biofuels: Microbial Fuel Cells
Bioenergy: production and oppurtunities and challenges

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BTUG402 Bioenergy

UNIT – III: Biomass Conversion Technology

Biochemical conversion; Hydrolysis, Enzyme and acid hydrolysis
Biofermentation; Trans-esterification; Anaerobic digestion

UNIT – IV: Bioenergy resources

Biofuels- sources and application; Biogas production from organic matter and residues
Biodiesel

UNIT – V: Sustainability and Environment

Sustainability: Theory and practices; Bioenergy and Sustainability
Waste management through microbes

PRACTICAL

Case study on Biofuel cells

BOOKS:

1. Anju Dahiya, Bioenergy: Biomass to Biofuels and Waste to Energy,2nd edition Academic Press Inc; 2020.
2. John Love, John A. Bryant, Biofuels and Bioenergy,1st edition, John Wiley & Sons Ltd., 2017.
3. Kenneth L. Starcher and Vaughn Nelson, Introduction to Bioenergy, 2nd edition, CRC Press.
4. Samir Kumar Khana, Bioenergy and Biofuel from Biowastes and Biomass, ASCE Publications, 2010.
5. Sunggyu Lee and Yatish T. Shah Biofuels and Bioenergy: Processes and Technologies, Taylor & Francis, 2012.