



# 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			-		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	-	-				
<b>BTUGE05</b>	<b>GE</b>	<b>Bioenergy</b>	60	20	20	-	-	3	-		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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**BTUGE05 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.

  
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