



**Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore**  
**Shri Vaishnav Institute of Technology and Science**  
**Choice Based Credit System (CBCS) Scheme in light of NEP-2020**  
**Generic Elective for UG (I Semester)**  
**(2026-Batch)**

| COURSE CODE | CATEGORY | COURSE NAME                                            | TEACHING & EVALUATION SCHEME  |                  |                         |                               |                         |   |   |   |         |
|-------------|----------|--------------------------------------------------------|-------------------------------|------------------|-------------------------|-------------------------------|-------------------------|---|---|---|---------|
|             |          |                                                        | THEORY                        |                  |                         | PRACTICAL                     |                         | L | T | P | CREDITS |
|             |          |                                                        | END SEM<br>University<br>Exam | Two Term<br>Exam | Teachers<br>Assessment* | END SEM<br>University<br>Exam | Teachers<br>Assessment* |   |   |   |         |
| GUME102     | GE       | CONVENTIONAL AND<br>NON CONVENTIONAL<br>ENERGY SOURCES | 60                            | 20               | 20                      | 0                             | 0                       | 4 | 0 | 0 | 4       |

**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:-**

The primary objective of the course is to describe and develop knowledge of (A) Conventional and Non-Conventional Source of energy (B) Solar and Wind energy (C) Biomass energy, (D) Geothermal energy

**Course Outcomes:-**

After completion of this course the students will be able to understand the following:

1. Conventional and non-conventional sources of energy have advantages and disadvantages.
2. Solar energy systems & devices and their applications.
3. Applications of wind energy and wind energy conversion system.
4. Biomass energy and its applications.
5. Geothermal Energy and its applications.

**Syllabus**

**Unit-I (10 Hrs)**

**Introduction to Energy Sources:** Energy sources and their availability, Conventional sources, non-conventional sources, advantages and disadvantages of conventional sources, Conventional energy in India, Conventional sources- coal, petroleum, and natural gas, Advantages of non-conventional sources, Prospects of non-conventional sources, World Energy Scenario, Indian Energy Scenario.

**Unit-II (11 Hrs)**

**Solar Energy:** Solar energy collectors – flat plate collectors and concentrating collectors, solar energy storage systems – mechanical, electrical, chemical, and electro-magnetic, solar pond, applications of solar energy – solar water heating, solar distillation, solar cooking.

**Unit-III (11 Hrs)**

**Wind Energy:** Basic principles of wind energy conversion, site selection considerations, basic components of Wind Energy Conversion System (WECS), classification of WEC

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systems, wind energy collectors – horizontal axis machines and vertical axis machines, generating systems, applications of wind energy.

**Unit-IV** **(12 Hrs)**

**Energy from Biomass:** Biomass conversion technologies, classification of biogas plants – floating drum plants and fixed dome plants, selection of site for biogas plant, Methods for obtaining energy from biomass, biomass gasification, classification of biomass gasifier, fixed bed gasifier and fluidized bed gasifier, applications of gasifier, advantages and limitations of gasifier.

**Unit-V** **(11 Hrs)**

**Geothermal Energy:** Geothermal sources, hydrothermal resources – vapor dominated, and liquid dominated systems, hybrid plants – geothermal preheat and fossil superheat; applications of geothermal energy, advantages, and disadvantages of geothermal energy.

**Text Books**

1. Sukhatme, S.P. 'Solar Energy' Tata McGraw Hill, New Delhi, 2008.
2. Khan, B. H. 'Non-Conventional Energy Resources' The McGraw Hill, 2009
3. Twidell, J.W. & Weir, A. 'Renewable Energy Source' EFN Spon Ltd., UK, 2006.
4. Sukhatme, S. P. and Nayak, J.K. 'Solar Energy – Principles of Thermal Collection and Storage' Tata McGraw-Hill, New Delhi, 2009.
5. Garg, Prakash 'Solar Energy: Fundamentals and Applications' Tata McGraw Hill, 2017.

**Reference Books**

1. Rai, G.D. 'Non-Conventional Energy Sources' Khanna Publications, New Delhi, 2011.
2. Khandelwal, K.C. & Mahdi, S.S. 'Biogas Technology – A Practical Handbook' Tata McGraw-Hill, 2008.
3. Tiwari, G.N. 'Solar Energy: Fundamentals Design, Modeling & Applications' Narosa Publishing House, New Delhi, 2012.

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4. Goswami Yogi, Krieth, Frank & Kreider, John F. 'Principles of Solar Energy' CRC Press, 2000.
5. Boyle, Godfrey 'Renewable Energy, Power for a Sustainable Future' Oxford University Press, U.K., 2012.

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