

# **J.S. University, Shikohabad**

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## **VALUE ADDED COURSE**

### **Renewable Energy for Agriculture: Solar, Wind, and Bioenergy Applications**

**Faculty of Agricultural Sciences**



J.S. University, Shikohabad  
Faculty of Agricultural Sciences

Value Added Course

AGVAC-08

## **Renewable Energy for Agriculture: Solar, Wind, and Bioenergy Applications**

**Course Overview:** This course aims to provide learners with an understanding of renewable energy technologies and their applications in agriculture. Through lectures, case studies, and hands-on activities, learners will develop skills in designing and implementing renewable energy systems that meet the energy needs of farming operations while promoting sustainable development.


**Course Outcomes:** Upon completion of this course, learners will be able to:

1. Understand the principles and concepts of renewable energy technologies, including solar, wind, and bioenergy.
2. Design and evaluate renewable energy systems for agriculture, including solar photovoltaic systems, wind turbines, and biogas digesters.
3. Apply knowledge of renewable energy technologies and practices to improve energy efficiency and reduce greenhouse gas emissions in farming operations.
4. Identify and assess the environmental and social impacts of renewable energy systems, and design strategies to mitigate them.
5. Understand the economic and policy factors that influence the adoption of renewable energy systems in agriculture, and apply this knowledge to develop sustainable energy plans.

### **Course Outline:**

#### **Module 1: Introduction to Renewable Energy for Agriculture**

- Importance of renewable energy for sustainable agriculture
- Basic concepts of solar, wind, and bioenergy technologies
- Types of renewable energy systems for agriculture

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**Module 2: Solar Energy Applications in Agriculture**

- Design principles and criteria for solar photovoltaic systems
- Performance evaluation and optimization of solar photovoltaic systems
- Case studies of successful solar energy applications in agriculture

**Module 3: Wind Energy Applications in Agriculture**

- Design principles and criteria for wind turbines
- Performance evaluation and optimization of wind turbines
- Case studies of successful wind energy applications in agriculture

**Module 4: Bioenergy Applications in Agriculture**


- Design principles and criteria for biogas digesters
- Performance evaluation and optimization of biogas digesters
- Case studies of successful bioenergy applications in agriculture

**Module 5: Environmental and Social Impacts of Renewable Energy Systems**

- Environmental and social impacts of renewable energy systems, including land use, biodiversity, and community development
- Strategies to mitigate the environmental and social impacts of renewable energy systems
- Case studies of successful environmental and social management of renewable energy systems

**Module 6: Economic and Policy Aspects of Renewable Energy in Agriculture**

- Economic and policy factors influencing the adoption of renewable energy systems in agriculture
- Financing and investment options for renewable energy systems in agriculture
- Sustainable energy planning and implementation

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**Assessment:**

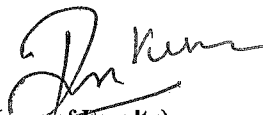
- Quizzes and assignments will be given at the end of each module to test learners' understanding of the concepts covered.
- A final project will require learners to design a renewable energy system for a specific farming operation.

**Course Duration:** This course is designed to be completed in 8 weeks, with approximately 4 hours of study per week.

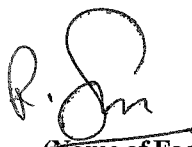
**Book References:**

1. Renewable Energy for Agriculture by S. S. Chandel and R. K. Sharma
  2. Renewable Energy Technologies: Their Applications in Developing Countries by O. O. Adegbenro and J. O. Odejobi
  3. Solar Energy: Fundamentals, Economic and Energy Analysis by D. Yogi Goswami
  4. Wind Energy: Fundamentals, Resource Analysis and Economics by Sathyajith Mathew
1. Bioenergy: Principles and Applications by S. C. Bhattacharya and S.


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