In Partnership With Diversity Learning Institute-DLI & Twikatane e.V Vermany

Master's Degree Course: Renewable Energy, M.Sc. RE
Course Duration: 12 months(1 year) 2 semesters(Total Credits = 60)

Modules distribution: 85% General Engineering, 15% Management

(A) **Modules Outline:**

Module Name	Module Code	Teaching Hours	Credits
Semester 1 Modules			
Fundamentals of Renewable Energy	RE 601	30 hours	10
- Introduction to Renewable Energy Sources	-	10 hours	-
- Energy Conversion Technologies	-	10 hours	-
- Renewable Energy Policies and Regulations	-	10 hours	-
Solar Energy Systems	RE 603	30 hours	10
- Photovoltaic Technology	-	10 hours	-
- Solar Thermal Systems	-	10 hours	-
- Solar Energy Applications	-	10 hours	-
Wind Energy Technologies	RE 605	30 hours	10
- Wind Turbine Technology	-	10 hours	-
- Wind Energy Conversion Systems	-	10 hours	-
- Wind Energy Integration	-	10 hours	-
Semester 2 Modules			
Biomass and Bioenergy	RE 602	30 hours	10
- Biomass Conversion Technologies	-	10 hours	-
- Biofuel Production and Applications	-	10 hours	-
- Biomass Energy Policies and Sustainability	-	10 hours	-
Hydropower Systems	RE 604	30 hours	10
- Hydropower Technology	-	10 hours	-
- Environmental Impact Assessment	-	10 hours	-
- Hydropower Project Management	-	10 hours	-
Geothermal Energy	RE 606	30 hours	10
- Geothermal Resource Exploration	-	10 hours	-
- Geothermal Power Plants	-	10 hours	-
- Applications of Geothermal Energy	-	10 hours	-

(B) **How Artificial Intelligence (AI) Can Be Applied in This Course:**

1. **Energy Forecasting and Optimization:**
    - Utilizing AI algorithms to analyze renewable energy production data for accurate forecasting and optimizing energy systems.
2. **Smart Grids and Demand Management:**
    - Implementing AI in smart grid systems to enhance demand management, improve grid stability, and integrate renewable energy sources efficiently.
3. **Remote Monitoring and Maintenance:**
    - Using AI for remote monitoring and predictive maintenance of renewable energy systems, reducing downtime and improving system reliability.
4. **Data Analytics for Performance Enhancement:**
    - Applying AI-driven data analytics to optimize the performance of renewable energy systems, identify inefficiencies, and enhance overall energy output.
5. **Energy Policy and Decision Support:**
    - Employing AI models for analyzing energy policies, regulations, and market trends to support decision-making in the renewable energy sector.
6. **Machine Learning for Resource Assessment:**
    - Utilizing machine learning algorithms for accurate resource assessment in renewable energy projects, such as solar and wind potential mapping.

By integrating AI into the Renewable Energy course, students can gain a comprehensive understanding of how advanced technologies can contribute to the efficient and sustainable use of renewable energy sources.