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DEBSEUz

MINISTRY OF HIGHER EDUCATION, SCIENCE AND INNOVATION OF THE REPUBLIC OF UZBEKISTAN

Karakalpak State University

"APPROVED"
Vice-Rector for Academic Affairs
_____O.Duysenbaev
№_____
«____» _____ 20___ year

«TRAINING COURSE ON RENEWABLE ENERGY SYSTEMS»

SYLLABUS FOR THE SHORT-TERM COURSE

DEBSEUz Training Center – Renewable Energy Sources

Total: 30 hours - 5 days (6 hours per day)

Nukus – 2025

	Module / Course Syllabus **Faculty of Physics**	

Course Name:	**Renewable Energy Systems (Short-Term Training Course)**
Type of Course:	Intensive / Professional Development
Course Code:	RES-TC-2025
Year:	-
Type of Study:	Full-time, 5-Day Intensive
Total Hours:	30 hours
Lectures	14 hours
Practical Classes	10 hours
Laboratory	6 hours
Assessment Type:	Written Test + Practical Presentation
Language of Study:	English / Uzbek (depending on group)

Course Objective (CO)	
CO1	The purpose of this short-term professional training program is to provide participants with essential theoretical knowledge and practical skills in renewable energy systems. The course aims to introduce participants to modern solar, wind, hybrid, and energy storage technologies; develop their ability to analyze renewable energy potential; design basic PV and wind systems; and perform laboratory measurements and safety procedures related to renewable energy systems.

Learning Outcomes (LO)	
	After completing the course, trainees will be able to:
LO1	Understand the basic structure and development of renewable energy in Uzbekistan. Identify the main types of renewable energy sources and their operational principles. Analyze solar radiation parameters and assess regional renewable energy potential. Design and calculate photovoltaic systems (module sizing, inverter selection, battery capacity). Perform laboratory measurements on PV modules, batteries, and wind turbines.

	Explain energy storage principles and evaluate grid integration challenges. Develop a mini-hybrid system design using solar and wind energy resources. Apply maintenance, safety and troubleshooting procedures in renewable energy systems.

Course Schedule (Calendar-Based)

№	Types of training	Topic title and its summary	Dedicated hours	Teacher's signature
DAY 1 — INTRODUCTION & ENERGY OVERVIEW (6 hours)				
1	Lecture session	Introduction to the Energy System of Uzbekistan	2	
2	Lecture session	Types of Renewable Energy Sources & Global Trends	2	
3	Practical session	Assessment of Regional Renewable Energy Potential	2	
DAY 2 — SOLAR ENERGY (6 hours)				
4	Lecture session	Solar Radiation & Measurement Methods	2	
5	Lecture session	Solar PV System Components & Operation	2	
6	Practical session	PV Module Calculation & System Sizing	2	
DAY 3 — LABORATORY DAY (6 hours)				
7	Laboratory session	Solar Radiation Measurement & PV Module Efficiency Testing	2	
8	Laboratory session	Battery Charge–Discharge Characteristics	2	
9	Laboratory session	Wind Turbine Laboratory – Power Curve Determination	2	
DAY 4 — ENERGY STORAGE & GRID INTEGRATION (6 hours)				
10	Lecture session	Energy Storage Systems & Grid Integration	2	
11	Practical session	Battery Sizing & Energy Reserve Calculations	2	
12	Practical session	Design of Hybrid Solar–Wind Power Supply Scheme	2	
DAY 5 — PROJECT DEVELOPMENT & FINAL ASSESSMENT (6 hours)				
13	Lecture session	Safety, Maintenance & Best Practices in Renewable Energy Systems	2	

14	Practical Session	Mini Project: Designing a Small PV/Wind Power System	2	
15	Assessment	Final Test & Group Presentation	2	
Total			**30**	

ASSESSMENT PROCEDURE FOR SHORT-TERM TRAINING COURSE

Assessment and Monitoring of Participant Performance

Assessment within this short-term training course is carried out based on participants' performance in practical tasks, laboratory activities, and the final project presentation.

Since the program is not part of the credit-module academic system, midterm examinations are not required. Instead, evaluation is focused on skills acquisition and competence demonstration. The total score for the course is 100 points, distributed across practical performance, laboratory work, and the final assessment.

Participants must earn at least 60 points to successfully complete the training and receive a certificate.

Types of Assessment (Adapted for Training Course)

Type of Evaluation		**Maximum Score**	**Passing Score**
1	Practical & Laboratory Performance	40	24
2	Mini-Project (System Design Task)	30	18
3	Final Test (20 questions)	30	18
	Total	100	60

- **Participation in practical and laboratory sessions – 20 points**
- **Completion of hands-on laboratory tasks – 20 points**
- **Mini Project: System design, calculations, and justification – 30 points**
- **Final written test (20 multiple-choice questions) – 30 points**

	Main References
1.	International Renewable Energy Agency (IRENA) Publications
2.	International Energy Agency (IEA) - World Energy Outlook
3.	PVsyst User Manuals

4.	Masdar & ACWA Power Technical Reports
5.	Global Solar Atlas and Global Wind Atlas
6.	Uzbekistan Ministry of Energy - Strategy Documents
7	DEBSEUz Project Training Materials
Additional References	
7.	Мирзиёев Ш.М. Эркин ва фаровон, демократик Ўзбекистон давлатини биргаликда барпо этамиз. Ўзбекистон Республикаси Президентининг лавозимига киришиш тантанали маросимига бағишланган Олий Мажлис палаталарининг қўшма мажлисидаги нутқи. –Т.: «Ўзбекистон» НМИУ,2016-56б.
8.	Мирзиёев Ш.М. Қонун устуворлиги ва инсон манфаатларини таъминлаш- юрт тараққиёти ва халқ фаровонлигининг гарови. Ўзбекистон Республикаси Конституцияси қабул қилинганининг 24 йиллигига бағишланган тантанали маросимдаги маъруза 2016 йил 7 декабрь. –Т.: «Ўзбекистон» НМИУ, 2016. - 48 б.
9.	Мирзиёев Ш.М. Буюк келажагимизни мард ва олийжаноб халқимиз билан бирга қурамиз. –Т.: «Ўзбекистон» НМИУ, 2017. - 488 б.
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12.	http://dhes.ime.mrsu.ru/studies/tot/tot_lit.htm
13.	http://rbip.bookchamber.ru/description.aspx?product_no=854;
14.	http://energy-mgn.nm.ru/progr36.htm

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This syllabus was approved by the minutes of the University Council meeting No. __, dated _____, 202_

The syllabus was approved by the minutes of the Faculty of Physics Council meeting No. ___ dated _____, 202_

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