

VAC135	RENEWABLE ENERGY SYSTEMS
Contact Hours	30 Hours
Prerequisite	Nil

Course Description

This course is designed to provide an in-depth understanding of renewable energy technologies, systems, and their applications. Participants will gain knowledge about various renewable energy sources, their integration into existing power systems, and the challenges associated with renewable energy deployment. The course will cover both theoretical concepts and practical applications, with a focus on the latest advancements in the field.

Course Objectives

Students will be able to :

- Comprehend the fundamental principles of renewable energy sources, including solar, wind, hydro, geothermal, and biomass.
- Analyze the design and operation of renewable energy systems.
- Understand the economic and environmental aspects of renewable energy projects.
- Evaluate the integration of renewable energy into existing power grids.
- Develop skills in project planning, implementation, and management in the renewable energy sector.
- Explore emerging technologies and innovations in renewable energy.

Course Outcomes

On completion of this course, students will be able to:

CO 1: Design and assess the performance of renewable energy systems.

CO 2: Evaluate the economic viability and environmental impact of renewable energy projects.

CO 3: Implement effective strategies for the integration of renewable energy into existing power systems.

CO 4: Analyze and troubleshoot issues related to renewable energy systems.

Course Content

Module 1: Introduction to Renewable Energy

5 hours

- Fossil fuels vs. renewable energy
- Importance of transitioning to renewable energy
- Solar energy
- Wind energy

- Hydropower
- Geothermal energy
- Biomass

Module II: Solar Energy Systems

5 hours

- Photovoltaic (PV) Technology
- Solar Power Systems
- Solar Site Assessment and Design

Module III: Wind Energy Systems

5 hours

- Wind Turbine Technology
- Wind Power Systems
- Wind Resource Assessment

Module IV: Hydropower and Other Renewable Sources

5 hours

- Hydropower Systems
- Geothermal Energy Systems
- Biomass and Bioenergy

Module V: Integration and Management

5 hours

- Energy Storage Systems
- Smart Grids and Microgrids
- Project Management and Economics

Module VI: Environmental Impact and Sustainability

5 hours

- Life Cycle Assessment
- Environmental Regulatory and Policy Framework

Practicum

1. Work with simulation tools for renewable energy system design.
2. Visit operational renewable energy projects to observe real-world applications.
3. Engage in case studies and group projects to solve practical problems in the renewable energy field.
4. Develop a small-scale renewable energy project as part of the course requirements.

Textbooks

"Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle

"Introduction to Renewable Energy" by Vaughn C. Nelson

"Wind Energy Explained: Theory, Design and Application" by James F. Manwell, Jon G.

McGowan, and Anthony L. Rogers

"Solar Engineering of Thermal Processes" by John A. Duffie and William A. Beckman
 "Biomass for Renewable Energy, Fuels, and Chemicals" by Donald L. Klass
 "Hydropower Engineering" by Arild Hervik
 "Energy Storage for Sustainable Microgrid" by S. M. Muyeen and A. Mohamed

Reference Books

"Renewable Energy Systems: A Smart Energy Systems Approach to the Choice and Modeling of 100% Renewable Solutions" by Henrik Lund
 "Integration of Renewable Energy Sources in Future Power Systems" by Lawrence E. Jones
 "Smart Grid: Technology and Applications" by Janaka Ekanayake and Nick Jenkins
 "Energy Economics: Concepts, Issues, Markets and Governance" by Subhes C. Bhattacharyya
 "Renewable Energy Finance: Powering the Future" by Charles W. Donovan

	Evaluation Component	Weightage (%)
1	Activities	20
2	Project	20
3	Attendance	10
4	End Term Examination	50


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K.R. MANGALAM UNIVERSITY
E D U C A T I O N F O R L I F E
(Recognized by UGC and a member of AIU)

Ref.No.:KRMU/Admin./Notice/2022-2023/ 3067(A)

Dated: 02nd August, 2022

NOTICE

This is to put for information that School of Engineering & Technology is offering Value-Added Course (VAC) for all interested students during Odd Semester as per the following specifications.

Course Code	Course Title	Coordinating Department / School	Duration
ETCS813A	Software Engineering Applications	SOET	30 Hrs.
VAC131	Employability and Analytical Skills-I	SOET	30 Hrs.
VAC132	Employability and Analytical Skills- II	SOET	30 Hrs.
VAC133	Employability and Analytical Skills-III	SOET	30 Hrs.
VAC134	3D Printing Technology	SOET	30 Hrs.
VAC135	Renewable Energy Systems	SOET	30 Hrs.

Maximum 100 seats are available for the course.

Course Start Date: 05 September 2022

Course End Date: 29 December 2022

All interested students are required to confirm their registration with the Dean-School of Engineering & Technology latest by **24th August, 2022**


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Copy to: K.R. Mangalam University
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- Vice Chancellor
- Dean (Academics Affairs)
- Controller of Examinations
- All Deans/ School Coordinators
- All Faculty Members/ Mentors
- Notice Board
- Office Copy

: For kind information



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ATTENDANCE SHEET
VAC COURSE FOR ACADEMIC YEAR 2022-23
COURSE CODE: VAC135
COURSE TITLE: RENEWABLE ENERGY SYSTEMS

ROLL NO	NAME	PROGRAMME	SEMESTER	5-Sep-22	8-Sep-22	10-Sep-22	12-Sep-22	15-Sep-22	17-Sep-22
2203100003	SAUMYA BARETH	B.Sc (H) Chemistry	Semester I	A		P	P	P	P
2203100002	YATHARTH SETHI	B.Sc (H) Chemistry	Semester I	P	A	P	P	A	A
2203100001	WAPANGMEREN	B.Sc (H) Chemistry	Semester I	A	A	P	P	A	P
2203090007	KASHISH	B.Sc (H) Physics	Semester I	A	P	P	P	P	P
2203090001	KUNAL	B.Sc (H) Physics	Semester I	P	A	A	P	P	A
2203090003	SUMIT YADAV	B.Sc (H) Physics	Semester I	A	P	P	P	P	P
2203090010	DISHA TYAGI	B.Sc (H) Physics	Semester I	A	P	A	P	A	P
2203370005	KARAN PRIYADARSHI	B.Sc.(H) Forensic Science	Semester I	A	P	P	P	A	P
2203370020	NEELAM SHEKHAVAT	B.Sc.(H) Forensic Science	Semester I	A	P	P	A	P	P

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COURSE CODE: VAC135
COURSE TITLE: RENEWABLE ENERGY SYSTEMS

ROLL NO	NAME	22-Sep-22	22-Sep-22	24-Sep-22	26-Sep-22	29-Sep-22	1-Oct-22	3-Oct-22	6-Oct-22	8-Oct-22	10-Oct-22
2203100003	SAUMYA BARETH	P		P	P	P	P	A	P	P	P
2203100002	YATHARTH SETHI	P		P	P	P	P	P	P	P	P
2203100001	WAPANGMEREN	P		P	P	P	P	P	A	P	P
2203090007	KASHISH	P		P	A	P	P	P	P	P	P
2203090001	KUNAL	P		P	P	P	P	P	P	P	P
2203090003	SUMIT YADAV	P		P	P	P	P	P	P	A	A
2203090010	DISHA TYAGI	P		P	P	P	P	P	A	P	P
2203370005	KARAN PRIYADARSHI	P		A	P	P	P	A	P	P	A
2203370020	NEELAM SHEKHAVAT	P		P	P	P	P	P	P	P	A


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COURSE CODE: VAC135
COURSE TITLE: RENEWABLE ENERGY SYSTEMS

ROLL NO	NAME	13-Oct-22	15-Oct-22	17-Oct-22	20-Oct-22	22-Oct-22	23-Oct-22	24-Oct-22	27-Oct-22	29-Oct-22	31-Oct-22
2203100003	SAUMYA BARETH	P	A	P	A	P	P	A	P	P	A
2203100002	YATHARTH SETHI	P	P	P	P	P	P	P	P	P	P
2203100001	WAPANGMEREN	P	P	P	P	P	P	P	P	P	P
2203090007	KASHISH	P	P	P	P	P	P	P	P	P	A
2203090001	KUNAL	P	P	P	P	P	P	P	A	P	P
2203090003	SUMIT YADAV	A	P	P	P	P	P	P	P	P	A
2203090010	DISHA TYAGI	P	P	P	P	P	P	A	P	P	P
2203370005	KARAN PRIYADARSHI	P	P	P	A	A	P	P	P	P	P
2203370020	NEELAM SHEKHAVAT	P	P	P	P	P	P	P	P	P	P


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VAC COURSE FOR ACADEMIC YEAR 2022-23
COURSE CODE: VAC135
COURSE TITLE: RENEWABLE ENERGY SYSTEMS

ROLL NO	NAME	1-Nov-22	5-Nov-22	7-Nov-22	10-Nov-22	12-Nov-22	14-Nov-22	17-Nov-22	19-Nov-22	21-Nov-22	24-Nov-22
2203100003	SAUMYA BARETH	P	P	P	P	P	P	P	P	P	P
2203100002	YATHARTH SETHI	P	P	P	P	P	P	P	P	P	P
2203100001	WAPANGMEREN	P	P	P	P	P	P	P	P	P	P
2203090007	KASHISH	P	P	P	P	A	P	P	P	P	A
2203090001	KUNAL	P	P	P	P	P	P	P	P	P	P
2203090003	SUMIT YADAV	P	P	A	P	P	P	P	P	P	A
2203090010	DISHA TYAGI	P	P	P	P	P	P	P	P	A	P
2203370005	KARAN PRIYADARSHI	P	P	P	A	P	P	P	A	P	P
2203370020	NEELAM SHEKHAVAT	P	P	P	P	P	P	P	P	P	P

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COURSE CODE: VAC135
COURSE TITLE: RENEWABLE ENERGY SYSTEMS

ROLL NO	NAME	26-Nov-22	28-Nov-22	1-Dec-22	3-Dec-22	5-Dec-22	8-Dec-22	10-Dec-22	12-Dec-22	15-Dec-22	17-Dec-22
2203100003	SAUMYA BARETH	P	P	A	P	A	P	P	A	P	P
2203100002	YATHARTH SETHI	P	P	P	P	P	P	P	P	A	P
2203100001	WAPANGMEREN	P	P	P	P	P	P	P	P	P	P
2203090007	KASHISH	A	A	A	P	P	P	P	P	P	P
2203090001	KUNAL	P	P	P	P	P	P	P	P	A	P
2203090003	SLAMH YADAV	A	A	P	P	P	P	P	P	P	P
2203090010	DISHA TYAGI	P	P	P	P	P	P	P	A	A	P
2203370005	KARAN PRIYADARSHI	A	P	P	P	P	P	P	P	P	P
2203370020	NEELAM SHEKHAVAT	A	P	P	P	A	P	P	A	P	A

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VAC COURSE FOR ACADEMIC YEAR 2022-23
COURSE CODE: VAC135
COURSE TITLE: RENEWABLE ENERGY SYSTEMS

ROLL NO	NAME	19-Dec-22	22-Dec-22	24-Dec-22	26-Dec-22	29-Dec-22	Total	Present	Percentage
2203100003	SAUMYA BARETH	P	P	A	P	A	51	39	76.47
2203100002	YATHARTH SETHI	A	A	P	P	A	51	43	84.31
2203100001	WAPANGMEREN	P	P	P	A	A	51	44	86.27
2203090007	KASHISH	P	P	P	A	A	51	41	80.39
2203090001	KUNAL	P	P	A	P	P	51	44	86.27
2203090005	DISHA TYAGI	A	P	A	P	P	51	41	80.39
2203370005	KARAN PRIYADARSHI	P	P	P	A	A	51	39	76.47
2203370020	NEELAM SHEKHAVAT	A	A	P	A	P	51	41	80.39

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Haryana 122103



VALUE ADDED COURSE (VAC)
ACADEMIC YEAR 2022-23
COURSE CODE: VAC135
COURSE TITLE: RENEWABLE ENERGY SYSTEMS
COURSE OFFERED BY: SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
LIST OF STUDENTS COMPLETING THE COURSE

S.NO	SESSION	ROLL NO	NAME	PROGRAMME	SEMESTER	COURSE CODE	COURSE TITLE	SCHOOL
1	2022-23	2203100003	SAUMYA BARETH	B.Sc (H) Chemistry	Semester I	VAC135	RENEWABLE ENERGY SYSTEMS	SCHOOL OF BASIC AND APPLIED SCIENCES (SBAS)
2	2022-23	2203100002	YATHARTH SETHI	B.Sc (H) Chemistry	Semester I	VAC135	RENEWABLE ENERGY SYSTEMS	SCHOOL OF BASIC AND APPLIED SCIENCES (SBAS)
3	2022-23	2203100001	WAPANGMEREN	B.Sc (H) Chemistry	Semester I	VAC135	RENEWABLE ENERGY SYSTEMS	SCHOOL OF BASIC AND APPLIED SCIENCES (SBAS)
4	2022-23	2203090007	KASHISH	B.Sc (H) Physics	Semester I	VAC135	RENEWABLE ENERGY SYSTEMS	SCHOOL OF BASIC AND APPLIED SCIENCES (SBAS)
5	2022-23	2203090001	KUNAL	B.Sc (H) Physics	Semester I	VAC135	RENEWABLE ENERGY SYSTEMS	SCHOOL OF BASIC AND APPLIED SCIENCES (SBAS)
6	2022-23	2203090003	SUMIT YADAV	B.Sc (H) Physics	Semester I	VAC135	RENEWABLE ENERGY SYSTEMS	SCHOOL OF BASIC AND APPLIED SCIENCES (SBAS)
7	2022-23	2203090010	DISHA TYAGI	B.Sc (H) Physics	Semester I	VAC135	RENEWABLE ENERGY SYSTEMS	SCHOOL OF BASIC AND APPLIED SCIENCES (SBAS)
8	2022-23	2203370005	KARAN PRIYADARSHI	B.Sc (H) Forensic Science	Semester I	VAC135	RENEWABLE ENERGY SYSTEMS	SCHOOL OF BASIC AND APPLIED SCIENCES (SBAS)
9	2022-23	2203370020	NEELAM SHEKHAVAT	B.Sc (H) Forensic Science	Semester I	VAC135	RENEWABLE ENERGY SYSTEMS	SCHOOL OF BASIC AND APPLIED SCIENCES (SBAS)

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This is to certify that **Saumya Bareth**, University Enrolment No **2203100003** of **B.Sc (H) Chemistry** programme has successfully qualified **VALUE ADDED COURSE VAC135 (RENEWABLE ENERGY SYSTEMS)** during Academic Session **2022-23 (Odd Semester)**.

Date: 20.02.2023

hachajan

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This is to certify that **Yatharth Sethi**, University Enrolment No **2203100002** of **B.Sc (H) Chemistry** programme has successfully qualified **VALUE ADDED COURSE VAC135 (RENEWABLE ENERGY SYSTEMS)** during Academic Session **2022-23 (Odd Semester)**.

Date: 20.02.2023

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This is to certify that **Wapangmeren**, University Enrolment No **2203100001** of **B.Sc (H) Chemistry** programme has successfully qualified **VALUE ADDED COURSE VAC135 (RENEWABLE ENERGY SYSTEMS)** during Academic Session **2022-23 (Odd Semester)**.

Date: 20.02.2023

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This is to certify that **Kashish**, University Enrolment No **2203090007** of **B.Sc (H) Physics** programme has successfully qualified **VALUE ADDED COURSE VAC135 (RENEWABLE ENERGY SYSTEMS)** during Academic Session **2022-23 (Odd Semester)**.

Date: 20.02.2023

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This is to certify that **Kunal**, University Enrolment No **2203090001** of **B.Sc (H) Physics** programme has successfully qualified **VALUE ADDED COURSE VAC135** (**RENEWABLE ENERGY SYSTEMS**) during Academic Session **2022-23** (**Odd Semester**).

Date: 20.02.2023

K. Mahajan

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This is to certify that **SUMIT YADAV**, University Enrolment No **2203090003** of **B.Sc (H) Physics** programme has successfully qualified **VALUE ADDED COURSE VAC135 (RENEWABLE ENERGY SYSTEMS)** during Academic Session **2022-23 (Odd Semester)**.

Date: 20.02.2023

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This is to certify that **Disha Tyagi**, University Enrolment No **2203090010** of **B.Sc (H) Physics** programme has successfully qualified **VALUE ADDED COURSE VAC135 (RENEWABLE ENERGY SYSTEMS)** during Academic Session **2022-23 (Odd Semester)**.

Date: 20.02.2023

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CERTIFICATE OF COMPLETION

This is to certify that **KARAN PRIYADARSHI**, University Enrolment No **2203370005** of **B.Sc.(H) Forensic Science** programme has successfully qualified **VALUE ADDED COURSE VAC135 (RENEWABLE ENERGY SYSTEMS)** during Academic Session **2022-23 (Odd Semester)**.

K. R. Mangalam

Date: 20.02.2023

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This is to certify that **Neelam Shekhavat**, University Enrolment No **2203370020** of **B.Sc.(H) Forensic Science** programme has successfully qualified **VALUE ADDED COURSE VAC135 (RENEWABLE ENERGY SYSTEMS)** during Academic Session **2022-23 (Odd Semester)**.

h. mahajan

Date: 20.02.2023

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