

B Voc PROGRAMME

in

**RENEWABLE ENERGY
TECHNOLOGY**

ORDINANCES

**FACULTY OF SCIENCE
UNIVERSITY OF LUCKNOW
LUCKNOW**

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B Voc (RENEWABLE ENERGY TECHNOLOGY)
FACULTY OF SCIENCE, UNIVERSITY OF LUCKNOW
LUCKNOW

(SIX - SEMESTER COURSE)

ORDINANCES

These Ordinances shall be effective from the academic session 2015-16, for B Voc (Renewable Energy Technology) in the Faculty of Science in the University of Lucknow, Lucknow. The B Voc Programme in Renewable Energy Technology has multiple entries and multiple exits such as **Certificate/Diploma/Advanced Diploma/B Voc under National Vocation Education Qualification Framework (NVEQF)**.

1. DURATION OF THE COURSE:

The duration of the B Voc course will be six semesters in three Academic Sessions. In each Academic Session, the First Semester shall be from 16th July to 31st December and Second Semester shall be from 1st January to 30th June. At the end of each Semester, the candidates shall be required to present themselves for examination.

The student who completes first semester in first year successfully and passes the examinations as prescribed in the relevant Ordinances and is opting out from further education in B Voc (Renewable Energy Technology), will be conferred Certificate in Renewable Energy Technology.

The student who completes first year i.e. first two semesters successfully and passes the examinations as prescribed in the relevant Ordinances and is opting out from further education in B Voc (Renewable Energy Technology), will be conferred Diploma in Renewable Energy Technology.

Similarly, the student who completes first two years i.e. four semesters successfully and passes the examinations as prescribed in the relevant Ordinance and is opting out from further education of third year in B Voc (Renewable Energy Technology), will be conferred Advanced Diploma in Renewable Energy Technology.

The degree of B Voc (Renewable Energy Technology) of the University of Lucknow shall be conferred on the candidate who pursues the prescribed course of study for six semesters and passes the examinations as prescribed in the relevant Ordinances.

2. ELIGIBILITY FOR ADMISSION:

For admission to B Voc (Renewable Energy Technology) course, a candidate should have passed 10 + 2 or equivalent examination with science stream at 10 + 2 or equivalent examination level with a minimum of 40% marks for General and OBC candidates and a minimum of 33% marks for SC/ST candidates.



3. NUMBER OF SEATS:

Presently, there shall be 25 seats for B Voc (Renewable Energy Technology) course.

4. ADMISSION:

- a) The admission to B Voc (Renewable Energy Technology), Semester – I shall be done based on the merit in 10 + 2 or equivalent examination or entrance examination conducted by the University.
- b) The reservation of seats shall be as per UP Government Notification issued from time to time and as per the rules of the University of Lucknow.
- c) In case where number of available seats is less and candidates secure same marks (percent) at the qualifying level examination, the admission of the candidate will be based upon securing higher marks in High School or equivalent examination.
- d) There shall be a provision of re-joining or re-admission to the B Voc (Renewable Energy Technology) in each exit points.
- e) A candidate cannot pursue two full time Under-Graduate courses simultaneously.
- f) The University reserves the right to cancel any admission at any stage.
- g) In case of any matter relating to the Under-Graduate admissions, the decision of the Admission Committee/Vice-Chancellor, University of Lucknow shall be final.
- h) All legal matters pertaining to the Under-Graduate admissions shall be subject to the Lucknow Jurisdiction only.

5. TEACHING:

Methods of teaching shall be a combination of lectures, tutorials, seminars, educational tours, assignments, laboratory work, workshop practice, industrial training and project work. The regular faculty of the University, guest faculty from the reputed Organizations/Institutes and Industrial Partners will be involved in teaching, practical and workshop practices. In addition, contractual faculties will also be involved in teaching and laboratory work/workshop practice. Distinguished experts shall also be invited for lectures and seminars on special topics.

6. ATTENDANCE:

- a) Every teaching staff member handling a class will take attendance till the last instruction day in the semester. The last date will be specified by the Dean, Faculty of Science in consultation with the Course Director. The percentage of attendance calculated up to this point, will be indicated by the concerned teaching staff.

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- b) Students are normally expected to attend 100% theory, tutorial and practical classes/workshop practices. However, no student shall be allowed to appear in the end semester examination in the paper unless he/she has put in at least 75% attendance during the course of instruction in each paper.
- c) The attendance in theory and practical sessions will be considered separately. In the case of shortage of attendance, the cases will be considered as per the rules of the University of Lucknow.

7. FEE STRUCTURE:

- a) The fees payable shall be Rs. 6,000/- per semester.
- b) A candidate who fails in a semester examination or fails to clear back paper examination, shall be allowed to attend the classes and appear in the next examination of the same semester as a repeat candidate on the payment of Rs. 5,000/- only.
- c) The back paper examination fee shall be the same as for the other Under-Graduate courses of the University of Lucknow.

8. RULES AND REGULATIONS FOR EXAMINATION:

- a) There shall be examination at the end of each semester as per scheme of examination and each student shall have to appear in all theory papers (Modules) and practical examinations/workshop practices, industrial training and project work, if applicable as prescribed in the syllabi.
- b) In first five semesters, there shall be eight theory papers of 100 marks each and a Laboratory examination/Workshop practice examination each of 200 marks.
- c) The break-up of marks in the Laboratory examination/Workshop practice examination will be 35% Viva-Voce, 40% for the conduct of practical in the examination and remaining 25% for the practical record files and attendance in the regular Laboratory/Workshop practice classes.
- d) In the final semester, there shall be only industrial training and project work of 350 marks and 650 marks respectively.
- e) Each theory paper shall have a compulsory question of 40% weightage and shall cover entire syllabus and there will be four units of two questions each. The candidate shall be required to answer one question from each unit.
- f) The project shall be based on energy problems/renewable energy problems/case studies.

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- g) Each semester, the maximum marks will be 1000.
- For Certificate in Renewable Energy Technology, the maximum total marks will be 1000.
 - For Diploma in Renewable Energy Technology, the maximum total marks will be 2000.
 - For Advance Diploma in Renewable Energy Technology, the maximum total marks will be 4000.
 - For B Voc in Renewable Energy Technology, the maximum total marks will be 6000.
- h) A candidate shall be declared to have passed a semester examination if he/she secures not less than 40% marks in each theory paper and practical examination and 40% marks in the aggregate. The result of the candidate shall be declared on the basis of performance in the semester examination. The conversion of raw scores into absolute grades shall be done as per the rules of the University of Lucknow.
- i) The final result of the candidate shall be declared on the basis of combined result of all semester examinations of the course. The final result grades shall be awarded as per the rules of the University of Lucknow.
- j) The facility of back paper/improvement paper in a semester examination shall be available as per the rules of the University of Lucknow.

9. EXEMPTED CANDIDATES:

- a) A candidate who fails in a semester and is allowed to reappear in the next examination of the same semester by paying the examination fee only, the candidate will not be allowed to attend the theory classes and practical sessions.
- b) A candidate can avail the facility of an exempted candidate only for the next two years. After expiry of two consecutive years, no candidate shall be allowed to appear in the examination.

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10. STRUCTURE OF B Voc (RENEWABLE ENERGY TECHNOLOGY) PROGRAMME:

Module Code	Name	Credit	Marks
YEAR – 1, SEMESTER - I			
GENERAL EDUCATION			
Module RET - 101	Applied Mathematics I	3	100
Module RET - 102	Applied Chemistry	3	100
Module RET - 103	Biochemistry	3	100
Module RET - 104	Communication Skills I	3	100
SKILL COMPONENT			
Module RET – 105	Energy Sources and Energy Scenario	3	100
Module RET – 106	Energy, Ecology and Environment Studies	3	100
Module RET – 107	Bio-energy Conversion Systems	3	100
Module RET – 108	Waste to Energy Conversion Systems	3	100
Module RET – 109	Module RET – 109 Laboratory I	6	200
YEAR – 1, SEMESTER - II			
GENERAL EDUCATION			
Module RET – 201	Applied Physics I	3	100
Module RET – 202	Basic Mechanical Engineering Systems	3	100
Module RET – 203	Thermodynamics, Heat and Mass Transfer	3	100
Module RET – 204	Communication Skills II	3	100
SKILL COMPONENT			
Module RET – 205	Solar Thermal Engineering and Applications	3	100
Module RET – 206	Concentrating Solar Thermal Power Plants	3	100
Module RET – 207	Power Plant Engineering	3	100
Module RET – 208	Engineering Graphics and Drawing I	3	100
Module RET – 209	Laboratory II	6	200
TOTAL		60	2000

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YEAR – 2, SEMESTER - III			
GENERAL EDUCATION			
Module RET – 301	Applied Physics II	3	100
Module RET – 302	Material Science for Energy Applications	3	100
Module RET – 303	Electronics and Instrumentation	3	100
Module RET – 304	Communication Skills III	3	100
SKILL COMPONENT			
Module RET – 305	Solar Cell and Photovoltaic Technologies	3	100
Module RET – 306	Programming C++/Java	3	100
Module RET – 307	Engineering Graphics and Drawing II	3	100
Module RET – 308	Energy Storage Systems	3	100
Module RET – 309	Laboratory III	6	200
YEAR – 2, SEMESTER - IV			
GENERAL EDUCATION			
Module RET – 401	Data Analyses and Interpretation	3	100
Module RET – 402	Applied Mathematics II	3	100
Module RET – 403	Basic Electrical Engineering Systems	3	100
Module RET – 404	Project Writing I	3	100
SKILL COMPONENT			
Module RET – 405	MATLAB	3	100
Module RET – 406	Solar Photovoltaic Power Plants	3	100
Module RET – 407	Smart and Micro-grid	3	100
Module RET – 408	Wind Energy Conversion Systems	3	100
Module RET – 409	Workshop Practices I	6	200
TOTAL		60	2000

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YEAR – 3, SEMESTER - V			
GENERAL EDUCATION			
Module RET – 501	Project Writing II	3	100
SKILL COMPONENT			
Module RET – 502	Energy in Buildings	3	100
Module RET – 503	Mini and Micro Hydro Energy Systems	3	100
Module RET – 504	Other Renewable Energy Systems	3	100
Module RET – 505	Hydrogen Energy and Fuel Cells	3	100
Module RET – 506	Energy Modelling and Project Management	3	100
Module RET – 507	Energy Economics and Planning	3	100
Module RET – 508	Energy Conservation and Management	3	100
Module RET – 509	Workshop Practices II	6	200
YEAR – 3, SEMESTER - VI			
SKILL COMPONENT			
Module RET – 601	Industrial Training	10	350
Module RET – 602	Major Project	20	650
TOTAL		60	2000

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**CURRICULUM STRUCTURE OF
B Voc (RENEWABLE ENERGY TECHNOLOGY) PROGRAMME**

The structure and the syllabus of the Course will consist of:

YEAR – 1									
SEMESTER – I									
GENERAL EDUCATION	CREDIT				SKILL COMPONENT	CREDIT			
	L	T	P	C		L	T	P	C
Module RET - 101 Applied Mathematics I	2	1	0	3	Module RET – 105 Energy Sources and Energy Scenario	2	1	0	3
Module RET – 102 Applied Chemistry	2	1	0	3	Module RET – 106 Energy, Ecology and Environment Studies	1	1	1	3
Module RET - 103 Biochemistry	2	1	0	3	Module RET – 107 Bio-energy Conversion Systems	2	1	0	3
Module RET - 104 Communication Skills I	1	1	1	3	Module RET – 108 Waste to Energy Conversion Systems	2	1	0	3
-					Module RET – 109 Laboratory I	0	0	12	6
Total Credits – 30									
SEMESTER – II									
GENERAL EDUCATION	CREDIT				SKILL COMPONENT	CREDIT			
	L	T	P	C		L	T	P	C
Module RET – 201 Applied Physics I	2	1	0	3	Module RET – 205 Solar Thermal Engineering and Applications	2	1	0	3
Module RET – 202 Basic Mechanical Engineering Systems	2	1	0	3	Module RET – 206 Concentrating Solar Thermal Power Plants	2	1	0	3
Module RET – 203 Thermodynamics, Heat and Mass Transfer	2	1	0	3	Module RET – 207 Power Plant Engineering	2	1	0	3
Module RET – 204 Communication Skills II	1	1	1	3	Module RET – 208 Engineering Graphics and Drawing I	1	1	1	3
-					Module RET – 209 Laboratory II	0	0	12	6
Total Credits - 30									

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YEAR - 2									
SEMESTER – III									
GENERAL EDUCATION	CREDIT				SKILL COMPONENT	CREDIT			
	L	T	P	C		L	T	P	C
Module RET – 301 Applied Physics II	2	1	0	3	Module RET – 305 Solar Cell and Photovoltaic Technologies	2	1	0	3
Module RET – 302 Material Science for Energy Applications	2	1	0	3	Module RET – 306 Programming C++/Java	1	1	1	3
Module RET – 303 Electronics and Instrumentation	2	1	0	3	Module RET – 307 Engineering Graphics and Drawing II	1	1	1	3
Module RET – 304 Communication Skills III	1	1	1	3	Module RET – 308 Energy Storage Systems	2	1	0	3
-					Module RET – 309 Laboratory III	0	0	12	6
Total Credits - 30									
SEMESTER – IV									
GENERAL EDUCATION	CREDIT				SKILL COMPONENT	CREDIT			
	L	T	P	C		L	T	P	C
Module RET – 401 Data Analyses and Interpretation	1	1	1	3	Module RET – 405 MATLAB	1	1	1	3
Module RET – 402 Applied Mathematics II	2	1	0	3	Module RET – 406 Solar Photovoltaic Power Plants	2	1	0	3
Module RET – 403 Basic Electrical Engineering Systems	2	1	0	3	Module RET – 407 Smart and Micro-grid	2	1	0	3
Module RET – 404 Project Writing I	1	1	1	3	Module RET – 408 Wind Energy Conversion Systems	2	1	0	3
-					Module RET – 409 Workshop Practices I	0	0	12	6
Total Credits - 30									

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YEAR – 3									
SEMESTER – V									
GENERAL EDUCATION	CREDIT				SKILL COMPONENT	CREDIT			
	L	T	P	C		L	T	P	C
Module RET – 501 Project Writing II	1	1	1	3	Module RET – 502 Energy in Buildings	2	1	0	3
					Module RET – 503 Mini and Micro Hydro Energy Systems	2	1	0	3
					Module RET – 504 Other Renewable Energy Systems	2	1	0	3
					Module RET – 505 Hydrogen Energy and Fuel Cells	2	1	0	3
					Module RET – 506 Energy Modelling and Project Management	2	1	0	3
					Module RET – 507 Energy Economics and Planning	2	1	0	3
					Module RET – 508 Energy Conservation and Management	2	1	0	3
						Module RET – 509 Workshop Practices II	0	0	12
Total Credits - 30									
SEMESTER – VI									
GENERAL EDUCATION	CREDIT				SKILL COMPONENT	CREDIT			
	L	T	P	C		L	T	P	C
-	-	-	-	-	Module RET – 601 Industrial Training	0	0	20	10
-	-	-	-	-	Module RET – 602 Major Project	0	0	40	20
Total Credits - 30									

*L – Lecture, *T – Tutorial, *P – Practical, *C – Credit

- After successful completion of Ist Semester, student will be **awarded Certificate in Renewable Energy Technology (Bio-energy Systems).**
- After successful completion of IInd Semester, student will be awarded **Diploma in Renewable Energy Technology (Bio-energy Systems and Solar Thermal Systems).**
- After successful completion of IVth Semester, student will be **awarded Advanced Diploma in Renewable Energy Technology (Bio-energy Systems and Solar Thermal and Photovoltaic Systems)**
- After successful completion of VIth Semester, student will be awarded **B Voc Degree in Renewable Energy Technology.**