Programme	B.Sc. (Engg.) Energy Engineering	Course Code	EE 111	Credit Hours	2 + 0 = 2
Course Title	**Sources of Energy**				

Course Introduction

Sources of Energy falls within the knowledge area of foundation courses providing basics of knowledge and understanding. This course gives the introduction on the Sources of energy which plays a pivotal role in empowering everything from industrial machinery to household appliances. It introduces to the students that they can be broadly categorized into two main types: renewable and non-renewable. Non-renewable sources, such as fossil fuels (coal, oil, and natural gas) and nuclear energy, have historically been the dominant providers of energy but are finite and associated with environmental challenges. On the other hand, renewable energy sources, including solar, wind, hydro, geothermal, and biomass, offer a more sustainable approach, as they are replenished naturally and typically have a lower environmental impact. The shift towards renewable energy is driven by the need to address climate change, reduce pollution, and ensure long-term energy security. As technology advances and the global focus on sustainability intensifies, the development and integration of diverse energy sources continue to evolve, shaping the future of how we generate, consume, and conserve energy.

Mapped SDGs	SDG-7: Affordable and Clean Energy

Learning Outcomes

1. **Describe** the importance of non-renewable and renewable energy sources. (C2)
2. **Explain** various technologies available for non-renewable and renewable energy sources. (C2)

Course Content		Assignments/Readings
Week 1	**Unit-I Introduction to Sources of Energy** 1.1 World Energy share statistics 1.2 Prospective energy generation technologies	The teacher may assign home assignments/problem-based learning/reading materials/learning activity etc.
Week 2	**Unit-II Non-Renewable Energy Sources** 2.1 Introduction to non-renewable energy sources. 2.2 Fossil fuel based energy.	
	2.3 Coal 2.3.1 Origin of coal 2.3.2 Coalification process	
Week 3	2.3.3 Gasification of Coal	
	2.3.4 Coal fired power plant	
Week 4	2.4 Natural Gas 1.4.1 Formation of Natural Gas 1.4.2 Exploration	

	1.4.3 Processing and distribution 1.4.4 Gas fired power plant	
Week 5	2.5 Petroleum 2.5.1 Formation of Petroleum	
	2.5.2 Exploration	
Week 6	2.5.3 Production	
	2.5.4 Oil fired power plant	
Week 7	2.6 Nuclear Energy 2.6.1 Uranium Resources	
	2.6.2 Power Generation from Nuclear Reactor	
Week 8	**Unit-III Renewable Energy Sources** 3.1 Introduction to renewable energy sources	
	3.2 Photovoltaic Energy 3.1.1 Photovoltaic Theory	
Week 9	3.1.2 Basic Types of Photovoltaics/Solar Cells	
	3.1.3 Solar PV systems	
Week 10	3.2 Wind Energy 3.2.1 Wind Energy Theory	
	3.2.2 Types of Wind Turbines	
Week 11	3.2.3 Components of Wind Turbine	
	3.2.4 Wind Farm	
Week 12	3.3 Hydroelectric Energy 3.3.1 Hydroelectric Theory	
	3.3.2 Types of Hydropower Systems	
Week 13	3.3.3 Main Types of hydro turbines	
	3.3.4 Classification of hydro turbines	
Week 14	3.4 Geothermal Energy 2.4.1 Geothermal Theory	
	2.4.2 Geothermal Power Plant	
Week 15	3.5 Bio Energy 3.5.1 Bio Energy Theory	
	3.5.2 Types of Biomasses	
Week 16	3.5.3 Production	
	3.5.4 Biomass power systems	

Textbooks and Reading Material

1. Rosa AV. (2021). Fundamentals of Renewable Energy Processes.Elsevier Publisher.
2. Everett, R., Boyle, G., Peake, S., &Ramage, J. (2021). Energy systems and sustainability: power for a sustainable future. Oxford Univerity Press.
3. Usher, B. (2019). Renewable Energy: a primer for the twenty-first century. Columbia University Press.
4. King, G.C (2018). Physics of Energy Sources. John Wiley and Sons, Ltd
5. Zehner, O. (2012). Green illusions: the dirty secrets of clean energy and the future of environmentalism. U of Nebraska Press.
6. Wengenmayr, R., & Bührke, T. (Eds.). (2011). Renewable energy: sustainable energy concepts for the future. John Wiley & Sons.
7. Tushar K. Ghosh (Author), Mark A. Prelas (2009) Energy Resources and Systems: Vol. 1: Fundamentals and Non-Renewable Resources. Springer**.**
8. Tushar K. Ghosh (Author), Mark A. Prelas (2009) Energy Resources and Systems: Vol. 2: Renewable Resources. Springer.

Teaching Learning Strategies

The learning and teaching strategies will be comprised of lectures via multimedia, white/blackboard, group discussions to enhance critical thinking, individual and group assignments, project based learning, reading and writing assignments, and presentations.

Assignments: Types and Number with Calendar

Week	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Activity	-	Assignment 1	-	-	-	-	-	-

Week	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Activity	-	Assignment 2		-	-	-	-	-

The abovementioned schedule of assignments/quizzes/presentations is tentative. The schedule will be provided to the students at the start of semester.

Assessment

Sr. No.	**Elements**	**Weightage**	**Details**
1.	Midterm Assessment	35%	Written assessment at the mid-point of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work, report writing, and viva-voce examination, etc.
2.	Sessional Assessment	25%	This assessment may include classroom participation, assignments, presentations, viva voce, attitude and

			behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written assessment at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work, report writing, and viva-voce examination, etc.