
M.Sc. PHYSICS

LIST OF ELECTIVE COURSES

PAPER IV - ENERGY PHYSICS

UNIT I : Introduction to Energy Sources

Energy sources – Types of energy sources – World energy futures- Energy sources and their availability – Prospects of renewable energy sources.

UNIT II : Solar Cells

Solar Cells: Solar cells for direct conversion of solar energy to electric powers – Solar cell parameter – Solar cell electrical characteristics – Efficiency – Single crystal silicon solar cells – Polycrystalline silicon solar cells – Cadmium sulphide solar cells.

UNIT III : Applications of Solar Energy

Solar water heating – space heating and space cooling – solar photo voltaics – agricultural and industrial process heat – solar distillation – solar pumping– solar furnace – solar cooking – solar green house.

UNIT IV : Wind Energy

Base principles of wind energy conversion wind data and energy estimation – Base components of wind energy conversion systems (WECS) types of wind machines – Generating systems – scheme for electric generation – generator control – load control – applications of wind energy.

UNIT V : Energy from Biomass

Biomass conversion Technologies – wet and Dry process – Photosynthesis-Biogas Generation: Introduction – basic process and energetic – Advantages of anaerobic digestion – factors affecting bio digestion and generation of gas – Classification of Biogas plants: Continuous and batch type – the dome and drum types of Bio gas plants – biogas from wastes fuel – properties of biogas – utilization of biogas.

BOOKS FOR STUDY AND REFERENCE:

1. F. Kreith and J.F. Kreider, Principles of Solar Engineering, Tata McGraw Hill (1978).
2. A.B. Meinel and A.P.Meinel, Applied Solar Energy, Addison Wesley Publishing Co. (1976).
3. M.P.Agarwal, Solar Energy, S. Chand and Co., New Delhi (1983).
4. S.P.Sukhatme, Solar Energy, Tata McGraw Hill (1997).
5. G.D. Rai, Non-conventional Energy sources, Khanna Publications, Delhi (2009).