

Syllabus

ETM 524- Fundamentals of Energy Science

Grading: 1 final exam (100%)

Sources: Lecture notes / Reading materials

In this course, the fundamental concepts related to energy; such as different types of energy (such as mechanical, chemical, light, heat, electrical), power, conversion efficiency and thermodynamics will be introduced. Uses of energy in everyday life such as heating, lighting, transportation and appliances will be given in physical concepts from the very basic concepts of Science. The working mechanisms of fossil fuel and renewable energy technologies, as well as of energy storage will be processed taking into account their physical theories. Basic physical connections that put limits on technology will be discussed and new developments that will overcome these limits will be explained. Physics, chemistry of main energy technologies and their relation with engineering design will be given at the most basic level. In addition, advanced topics ranging from nano-technological developments, solid state materials, fuel cells, wind, solar, photovoltaics, batteries, supercapacitors as well as the principles of manufacturing quantum computers will be discussed.