

<b>Department of Mechanical Engineering</b>			
<b>Energy Conversions (67548)</b>			
<b>Total Credits</b>	<b>3</b>		
<b>major compulsory</b>			
<b>Prerequisites</b>	P1 : Heat Transfer I (67420) OR Heat Transfer (67415)		
<b>Course Contents</b>			
Energy growth and economics. Energy classification, sources and utilization. Principal fuels for energy conversion. Production of thermal energy. Fossil-fuel systems. Nuclear reactor design and operation. Environmental impact of power plant operation. Production of mechanical and electrical energy. Energy storage.			
<b>Intended Learning Outcomes (ILO's)</b>		<b>Student Outcomes (SO's)</b>	<b>Contribution</b>
1	Ability to compare competing energy conversion technologies on an economic and efficiency basis and to assess the validity of energy conversion claims made in popular media	H	20 %
2	Identify the thermodynamic power cycles and the associated processes and fuels.	E	10 %
3	Categorize the basic principles renewable and non renewable energy as fossil fuels, nuclear energy, solar energy, geothermal energy, wind energy conversion and Biomass energy.	H	50 %
4	Work in team, perform a project and present the work in proper ways related to renewable or non renewable energy	D	20 %
<b>Textbook and/ or References</b>			
Textbook: Energy Conversion, D. Yogi Gaswami & F. Kreith, Taylor & Francis 2007. ,References: 1. Principles of Energy Conversion, 2nd ed., A. W. Culp, Jr., McGraw-Hill. (1991) 2. Handbook of Energy Efficiency and Renewable Energy, F. Kreith & D. Yogi Gaswami, Taylor & Francis 2008. 3. Energy and Problems of a Technical Society, 2nd ed., J. J. Kraushaar & R. A. Ristinen, John Wiley & Sons (1997). 4. Fundamentals of Nuclear Science and Engineering, 2nd ed., J. K. Shultis and R. E. Faw (2008). 5. Principles of Solar Engineering, 2nd ed., D. Yogi Goswami, F. Kreith, J. F. Kreider, Taylor & Francis (2000). 6. Solar Engineering of Thermal Processes, 3rd ed., J. A. Duffie and W. A. Beckman, John Wiley & Sons (2006).			
<b>Assessment Criteria</b>		<b>Percent (%)</b>	
First Exam		15 %	
Second Exam		15 %	
Quizzes		10 %	
Projects		20 %	
Final Exam		40 %	
<b>Course Plan</b>			
<b>Week</b>	<b>Topic</b>		
1 to 2	Introduction to Energy		
2 to 4	Energy resources		
5 to 6	Sources of Thermal Energy & Conversion		
7	First Exam		
8 to 10	Electromagnetic-to-Electrical Energy Conversion		
11 to 12	Chemical-to-Electrical Energy Conversion		

13	Second Exam
14	Mechanical-to-Mechanical Energy Conversion
15	Introduction to Energy Storage
16	Final Exam