Shahid Chamran University of Ahvaz

Vice-Chancellor of Education and Postgraduate Education

The special lesson plan of graduate education courses of the university

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academic semester: 131400-1400	**group:** mechanic	**College:** engineering
Number of units: 3	**Course name: Selected topics in energy**	**Degree: Master's degree**

The position of the course in the curriculum of the course: main

General purpose:

Deep familiarity and understanding with energy conversion and storage methods

learning goals:

After completing this course, students should have learned the following:

Familiarity with all methods of energy conversion and storage

Input behavior:

The student should have a basic familiarity with different types of energy.

Educational materials and facilities:

Familiarity with information bases in order to carry out the project, as well as familiarity with the software PowerPoint is required in order to present the project.

teaching method:

In addition to teaching concepts, educational films are also used

Duties of the student:

Studying the lesson, participating in the test and doing the project and presenting it

Test and evaluation method:

Midterm: 7 marks

End of the semester: 9 marks

Project: 4 marks

Lesson resources:

1- New Renewable Energy Sources, World Energy Council, translated by A. Kaherbaian, Ministry of Energy, Office of Renewable Energy, 1375.

2 - MM El-Wakil, Powerplant Technology, McGraw-Hill, 2002.

3 - B. Sorensen, Renewable Energy, 4th Edition, Academic press, 2011.

4 - Thermal Energy Storage and Application

5- Solar Thermal Energy Storage 6- Survey of Thermal Energy Storage Installation

6 - Semiconductor Solar Energy Converters

7- Thermal Energy Storage for Commercial application

1st week

(6/23/1400 to 6/29/1400)

Classification of energy carriers (including primary and secondary energy)

- Definition of energy
- Basic definitions and concepts in energy economy coal
- Types of coal
- Different users of coal

second week

(6/30/1400 to 7/5/1400)

crude oil

- Types of oil wells
- Methods of extraction and increase of harvest
- Types of crude oil available in Iran and the world

The third week

(6/7/1400 to 12/7/1400)

natural gas

- Types of natural gas
- Different types of gas fuels
- Gas condensate
- Different methods of pricing natural gas

forth week

(7/13/1400 to 7/19/1400)

Nuclear energy

- Different methods of nuclear energy extraction
- Nuclear fission
- Nuclear fusion
- Playing an educational film

The fifth week

(20/76/1400 to 26/7/1400)

Renewable energies:

- wind energy
- Hydroelectric energy
- biomass
- solar energy
- Broadcasting an educational film related to different types of renewable energies

The sixth week
(27/7/1400 to 3/8/1400)

Renewable energies:

- geothermal
- Energy of seas and oceans
- Broadcasting an educational film related to different types of renewable energies

The seventh week
(4/8/1400 to 10/6/1400)

Renewable energies:

- Wave energy
- Artificial photosynthesis
- Root and fashion
- Broadcasting an educational film related to different types of renewable energies

The eighth week
(11/8/1400 to 17/8/1400)

Heat energy production

- Converting mechanical energy into thermal energy
- Conversion of potential energy into thermal energy
- Converting kinetic energy into heat energy

ninth week
(8/18/1400 to 8/24/1400)

Heat energy production

- Conversion of frictional work into heat energy
- Using a heat pump
- Converting kinetic energy into heat energy

tenth week

(25/8/1400 to 1/9/1400)

Heat energy production

- (Reverse) Carnot cooling cycle
- Condensation cooling cycle
- Inverted Brayton cycle (gas turbine).

The eleventh week

(2/9/1400 to 8/9/1400)

Converting electrical energy into thermal energy

- Electrical Heating
- heating element
- electric heater

The twelfth week

(9/9/1400 to 9/15/1400)

Converting electrical energy into thermal energy

- Convection heaters
- Fan heaters
- Storage electric heaters
- Water heating

The thirteenth week

(16/9/1400 to 22/9/1400)

Converting electrical energy into thermal energy

- Environmental effects and efficiency
- Electric heating in industry
- Dielectric heating
- Induction heating
- Playing an educational film

The fourteenth week

(9/23/1400 to 9/29/1400)

Converting chemical energy into thermal energy

- Combustion
- fuel

15th week

(9/30/1400 to 10/6/1400)

Convert electromagnetic energy into thermal energy

- Mechanical energy production: thermal energy conversion
- Playing an educational film

The sixteenth week

(7/10/1400 to 13/10/1400)

Electric energy production

Energy storage

- Playing an educational film