

Egypt-Japan University of Science and Technology

School of Energy Resources, Environment, Chemical and Petrochemical Engineering

Undergraduate Program



جامعة بحثية مصرية ... ذات شراكة يابانية

**EGYPTIAN RESEARCH-ORIENTED UNIVERSITY
____WITH JAPANESE PARTNERSHIP____**

Energy Resources Engineering Program (ERE)

Sustainable Energy and Environmental issues are the greatest threat to our planet this century. There is evidence that relates climate change to consumption of Energy; in particular, large Power stations.

The Energy Resources Engineering Program is intended to provide state of the art education in conventional and Renewable Energy Resources and its conversion by means of economically and environmentally sustainable system and technology. The Program is interdisciplinary in nature; it contains mechanical, electric, and environmental subjects w

Specialization outcomes :

- Evaluate the sustainability and environmental issues related to mechanical power systems.
- Use energy efficiently.
- Apply industrial safety.
- Apply and integrate knowledge, understanding and skills of different subjects and available computer software to solve real problems in industries and power stations.
- Lead or supervise a group of engineers, technicians and work force.
- Carry out preliminary designs of fluid transmission and power systems, investigate their performance and solve their essential operational problems.
- Design, operate and maintain internal combustion and steam engines.

PROGRAM COURSES

Core Courses (courses weight 2 or 3 credit hours)

| Code | Course Title |
|----------------|--------------------------------------|
| ERE 311 | Project Based Learning on ERE |
| ERE 312 | Fluid Mechanics (2) |
| ERE 313 | Thermodynamics (2) |
| ERE 314 | Numerical Methods for Engineers |
| ERE 315 | Refrigeration and Air Conditioning |
| ERE 316 | Experimental Methods for Engineers |
| ERE 321 | Seminar on ERE |
| ERE 322 | Combustion and Air Pollution |
| ERE 323 | Power Stations |
| ERE 324 | Basics of Renewable Energy |
| ERE 325 | Solar Energy |
| ERE 411 | Design of Thermal and Energy Systems |
| ERE 412 | Sustainable Energy |
| ERE 421 | Energy Storage and Transmission |
| ERE 422 | Energy Conversion and Management |
| ERE 450 | Industrial Training |
| ERE 311 | Project Based Learning on ERE |

Elective Courses: (Each course weights 3 credit hours)

| Code | Course Title |
|---------|---|
| ERE 413 | Hydraulic Machines and Hydraulic Stations |
| ERE 414 | Desalination Technology |
| ERE 415 | Energy Systems and Power Plants and Economics |
| ERE 316 | Computational Fluid Dynamics (CFD) |
| ERE 417 | Safety Codes and Environmental Laws |
| ERE 418 | Project Management |
| ERE 419 | Basics of Electrical Power and Smart Grid |
| ERE 423 | Energy Systems |
| ERE 424 | Energy Efficient Buildings |
| ERE 425 | Energy Economics |
| ERE 426 | Nuclear Power Plants |
| ERE 427 | Gas Turbines |
| ERE 428 | Diesel Engines |
| ERE 429 | Electric Power and Machines |
| ERE 430 | Turbines and Compressors |
| ERE 431 | Thermal-Hydraulic Power Plants |
| ERE 432 | Heat Exchangers |

Graduation Project Thesis:

- ERE 410 Senior Project Thesis (4 Credits)
- ERE 420 Senior Project Thesis (4 Credits)

[Check Department Study Plan](#)

Chemical and Petrochemical Engineering Program (CPE):

The chemical and petrochemical engineering program is looking for strengthen its position in areas where it is viewed as preeminent, including: chemical process industries, unit operation, separation processes, transport phenomena, catalysis and reaction engineering, pharmaceutical engineering, advanced process modeling and process simulations. Continue to build upon our strong foundation in areas including green chemistry, clean production and renewable energy (e.g., solar, biofuels, energy storage) and to some extent in pharmaceutical and biomedical engineering, with the aim of becoming recognized as a top-tier program for education and research in these areas.

Specialization outcomes :

- Demonstrate knowledge and understanding of the fundamentals, basic characteristics and features of organic and inorganic reactions, and their application in chemical process industries including petroleum refining, natural gas processing, petrochemicals industry, electrochemistry, fertilizers and ceramics, etc.
- Demonstrate knowledge and understanding of the principles of chemical engineering including chemical reaction equilibrium and thermodynamics; mass and energy balance; transport processes; separation processes, mechanical unit operations and process control.
- Demonstrate knowledge and understanding of general principles of design techniques specific to particular products and processes including reactor and vessel design.
- Demonstrate knowledge and understanding of environmental impact of various industries, waste minimization and treatment of industrial facilities.
- Integrate steps into a sequence and apply analysis technique such as energy and mprocessing ass balance.



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- • Collect data, draw simplified equipment flow sheets, charts and curves and interpret data derived from laboratory observation.
- Perform complete mass and energy balances for chemical engineering plants.
- Conduct troubleshooting in chemical engineering plants.
- Use chemical engineering IT tools and programming in design.
- Determine the characteristics and performance of measurement and control systems.

Compulsory Courses: (Each course weights 3 credit hours)

| Code | Course Title |
|---------|--|
| CPE 213 | Material and Energy Balance |
| CPE 311 | Seminar on CPE (2Cr.hr) |
| CPE 312 | Thermodynamics for Chemical Eng. |
| CPE 313 | Chemical Process Technologies I (Organic.) |
| CPE 314 | Chemical Process Technologies II (Inorganic) |
| CPE 315 | Chemical Reaction Kinetics |
| CPE 316 | Separation Processes |
| CPE 321 | Project Based Learning on CPE (2Cr.hr) |
| CPE 322 | Chemical Process Technologies III (Gas and Petrochemicals) |
| CPE 323 | Corrosion and Electrochemical Eng. |
| CPE 324 | Chemical Process Modeling |
| CPE 325 | Mechanical Separation Process |
| CPE 411 | Unit operations Laboratory |
| CPE 412 | Chemical Process control |
| CPE 421 | Clean Production and Sustainable Development |
| CPE 422 | Plant Design and Process simulation |
| CPE 450 | Industrial Training |

Elective Courses (Each course weights 3 credit hours)

| Code | Course Title |
|---------|--|
| CPE421 | Petroleum Engineering |
| CPE422 | Polymers Engineering |
| CPE423 | Catalysis Engineering |
| CPE424 | Desalination Technologies |
| CPE425 | Design of Waste Treatment Units |
| CPE426 | Biofuel Engineering |
| CPE427 | Chemical Engineering Computer Skills |
| CPE428 | Renewable Energy Resources and Engineering |
| CPE429 | Fuel Cell Engineering |
| CPE430 | Surface Analysis |
| CPE431 | Biochemical Engineering and Biotechnology |
| CPE432 | Process Optimization |
| CPE433 | Air Pollution Control |
| CPE434 | Chemical Process Safety |
| CPE435 | Introduction to Nanotechnology |
| CPE436 | Biochemicals and food Industry |
| CPE 437 | Chemical Engineering Materials |

Graduation Project Thesis:

- CPE 415 Senior Project I
- CPE 420 Senior Project II

Industrial training

- CPE 450 Industrial Training (3 credit hours)

[Check Department Flow Chart and Study Plan](#)