

Geothermal Energy Courses

GEO601	Geothermal Systems
GEO602	Geothermal Exploration Techniques
GEO603	Drilling Techniques and Logging Methods
GEO604	Reservoir Physics, Well Test Analysis, Monitoring & Forecasting
GEO605	Direct and Indirect Use of Geothermal Resources
GEO606	3D Visualisation and Modeling Techniques
GEO607	Geothermal Power Plants

Geothermal Energy Courses

Geothermal Systems

Course content includes the main characteristics of low-, medium-, and high-enthalpy geothermal reservoirs in various tectonic settings, including thick continental sediment basins, continental and oceanic rifts.

Hydrothermal aquifers; magmatic systems; fracture zone systems; hot dry rock (HDR); enhanced geothermal systems; and deep geothermal resources.

There will be a brief introduction to deep geothermal drilling, deep geothermal projects, reservoir simulation, and man-made seismicity. Also, an evaluation and analysis of geological-, geophysical-, and geochemical models of low- and high- temperature geothermal systems.

June 2009

Course Number: GEO601
Course Duration: 1 week
ECTS Credits: 2
Time Schedule: 15/06 - 20/06
Full Course Fees: EUR 600
Students & Affiliates: EUR 300

Lecturing Professor:

Dr. Ingo Sass

Professor at
Darmstadt University of Technology
Institute of Applied Geosciences
Germany

For registration, course fees and additional information

please contact: res@res.is or visit: www.res.is/graduateschool/page/course_catalog

Geothermal Energy Courses

Geothermal Exploration Techniques

Course content includes geophysical methods to identify structural and tectonic features, alteration/metamorphic zones and hydro-geological characteristics. Methods include heat flow surveys; DC-resistivity depth soundings and profiling; EM and MT surveys; magnetic surveys, earthquake monitoring; as well as seismic measurements.

Fundamentals of chemical properties of geothermal fluids; a review of chemical thermodynamics and heat and mass transfer related to geothermal utilization.

Geochemical methods used to evaluate the chemical composition of geothermal fluids and gases; methods of sampling, analysis and interpretation of results. Geothermometers; Estimation of fluid flow and mixing in geothermal reservoirs.

June - July 2009

Course Number: GE0602
Course Duration: 3 weeks
ECTS Credits: 6
Time Schedule: 22/06 - 10/07
Full Course Fees: EUR 1800
Students & Affiliates: EUR 900

Lecturing Professors:

Dr. Axel Bjornsson

Professor at University of Akureyri, Iceland

Dr. Hrefna Kristmannsdottir

Professor at University of Akureyri, Iceland

Dr. Laust Borsting Pedersen

Professor at Uppsala University, Sweden

Dr. Andri Stefansson

Scientist at University of Iceland

For registration, course fees and additional information

please contact: res@res.is or visit: www.res.is/graduateschool/page/course_catalog

Geothermal Energy Courses

Drilling Techniques and Logging Methods

Course content includes an overview of drilling equipment, methods and technology; advanced drilling techniques; the design of wells and casing programs, cementing techniques, cleaning and repairs of production wells, and well maintenance. Iceland's Deep Drilling Project (IDDP).

Also included will be a study of borehole geology and interpretation of alteration mineralogy of drill cuttings and cores; geophysical well logging; 3D imaging; fracture imaging; stress orientation and stress characterization; and hydraulic fracturing.

For registration, course fees and additional information

please contact: res@res.is or visit: www.res.is/graduateschool/page/course_catalog

June 2009

Course Number: GEO603
Course Duration: 2 weeks
ECTS Credits: 4
Time Schedule: 13/07 - 24/07
Full Course Fees: EUR 1200
Students & Affiliates: EUR 600

Lecturing Professors:

Dr. Nichols Davatzes

Assistant Professor at Temple University
College of Science & Technology,
Geology Department
Philadelphia, United States

Dr. Hrefna Kristmannsdottir

Professor at University of Akureyri, Iceland

Mr. Sverrir Thorhallsson

Head of Engineering Division at
ISOR – Iceland GeoSurvey

Geothermal Energy Courses

Reservoir Physics, Well Test Analysis, Monitoring & Forecasting

Course content includes reservoir physics, including hydrological characteristics and water storage capacity, conceptual models of heat and mass flow within geothermal reservoirs, and assessing the hot water and power production capacity (reserve estimation). Production engineering and flow characteristics in wells will also be covered.

Deliverability, flow rates and pressure, pressure profiles in reservoirs and reservoir performance; inflow performance of water and steam; pressure profiles in wells for water, steam and two-phase flow; artificial lift and pressure profiles; well-test analysis including down-well surveys and discharge.

The physical and chemical monitoring of geothermal reservoirs, monitoring parameters; real-time monitoring and modeling, model updates, and optimal production strategies; sustainable utilization and forecasting the long-term response of reservoirs to exploitation, and effects of fluid re-injection.

For registration, course fees and additional information

please contact: res@res.is or visit: www.res.is/graduateschool/page/course_catalog

June - July 2009

Course Number: GEO604
Course Duration: 3 weeks
ECTS Credits: 6
Time Schedule: 27/07 - 14/08
Full Course Fees: EUR 1800
Students & Affiliates: EUR 900

Lecturing Professors:

Dr. Gudni Axelsson

Head of Physics Division at
ISOR – Iceland GeoSurvey

Dr. Jonas Eliasson

Professor Emeritus at University of Iceland

Dr. Jon Steinar Gudmundsson

Professor at Norwegian University of Science &
Technology, Department of Petroleum
Engineering & Applied Geophysics

Dr. Hrefna Kristmannsdottir

Professor at University of Akureyri, Iceland

Geothermal Energy Courses

Direct and Indirect Use of Geothermal Resources

Course content includes geotechnical and hydro-geological ground investigation, engineering design, operation and maintenance of shallow geothermal systems. Capital and O&M costs. Cost comparison with conventional heating systems. Geothermal heat pumps (GHP), borehole heat exchangers (BHE) and coupled GHPs.

Also, there will be discussion of geothermal groundwater well systems; heat pipe heat-exchangers; analytical and numerical design of borehole heat exchanger fields. Heating and cooling systems. Geothermal response test (GRT), enhanced geothermal response test (EGRT), and geothermal site investigation in the field and in the laboratory.

Design of pipe network and of pipe material. Utilization of geothermal energy for swimming pools and health spas, greenhouses and agriculture production, fish farming and aquaculture, snow-melting, and various industrial processes.

For registration, course fees and additional information

please contact: res@res.is or visit: www.res.is/graduateschool/page/course_catalog

August 2009

Course Number: GEO605
Course Duration: 2 weeks
ECTS Credits: 4
Time Schedule: 17/08 - 28/08
Full Course Fees: EUR 1200
Students & Affiliates: EUR 600

Lecturing Professor:

Dr. Ingo Sass

Professor at
Darmstadt University of Technology
Institute of Applied Geosciences
Germany

Dr. Pall Valdimarsson

Professor at University of Iceland

Geothermal Energy Courses

3D Visualisation and Modeling Techniques

Course content includes an introduction to visualization techniques of spatial data, history, development, applications and technological possibilities. Pre-modeling data preparation and management. 2D/3D gridding; modeling of fault geometries, building stratigraphic sequences, constructing final 3D volumes, data output, and 2D digitizing operations. Methods of 3D geological model building based on surface data, model analysis, validation and understanding.

Determining borehole design and positioning. Introduction to the advanced mapping software PETREL and geological models; case studies from Europe of 3D model building.

A tutorial on data analysis, statistics, learned workflows, export formats, validation and evaluation of calculated models.

August - September 2009

Course Number: GE0606
Course Duration: 2 weeks
ECTS Credits: 4
Time Schedule: 31/08 - 11/09
Full Course Fees: EUR 1200
Students & Affiliates: EUR 600

Lecturing Professor:

Dr. Juraj Janocko

Professor and Director at
the Technical University of Kosice
Faculty BERG, Institute of Geosciences
Slovakia

For registration, course fees and additional information

please contact: res@res.is or visit: www.res.is/graduateschool/page/course_catalog

Geothermal Energy Courses

Geothermal Power Plants

Course content includes design, thermodynamics performance, and economics of geothermal power plants for electricity generation – direct (dry) steam plants, single-, double-, and multiple-flash plants; binary-cycle plants, hybrid plants (including Kalina), and combined heat and power (CHP) plants.

The details of power plant efficiency. The various pieces of power plant equipment and components including turbines, generators, condensers/ evaporators/heat exchangers, separators, pipes, pumps production/injection wells, etc. Corrosion or scaling potential. Capital cost, operation and maintenance (O&M) costs. Environmental impacts of geothermal utilization, and mitigation.

September 2009

Course Number: GEO607
Course Duration: 2 weeks
ECTS Credits: 4
Time Schedule: 14/09 - 25/09
Full Course Fees: EUR 1200
Students & Affiliates: EUR 600

Lecturing Professors:

Dr. Ronald DiPippo

Chancellor Professor Emeritus of
Mechanical Engineering and
former Associate Dean of Engineering
at University of Massachusetts Dartmouth
United States

For registration, course fees and additional information

please contact: res@res.is or visit: www.res.is/graduateschool/page/course_catalog