

ASIAN INSTITUTE OF TECHNOLOGY

Offers
Master's and Doctoral Degrees
In

- ***Electric Power System Management***
- ***Energy Economics and Planning***
- ***Energy Technology***



ENERGY PROGRAM

School of Environment, Resources and Development

ASIAN INSTITUTE OF TECHNOLOGY
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1. INTRODUCTION

The commercial energy consumption in the Asia-Pacific region increased by 32.5% during 1990 – 2000 compared to the world's increase of only 11%. This has serious implications for local, national, regional and global environments and for energy security. It is thus important for the Asian countries to have energy experts who are well trained in modern planning and management approaches, energy technologies and energy policy concepts. This will enable them to steer the energy development in a manner that supports economic growth, environmental preservation and energy industry restructuring. The future Asian energy experts and policy makers could become more effective if they are familiar with energy policy experiences as well as with the clean and efficient energy technologies developed in industrialized countries. At the same time, prospective energy professionals from industrialized countries also could benefit significantly from the knowledge of energy sector developments in Asia - a region with rapidly growing market opportunities for new energy technologies. Students pursuing careers in energy, therefore enjoy exciting prospects in energy companies, consulting firms, ministries/government agencies, and in educational /research institutions.

The Energy Program of the Asian Institute of Technology was set up in 1979 to train energy specialists in response to the regional needs for developing capability for efficient development and management of the energy sector. The Energy Program, now within the framework of the School of Environment, Resources and Development, has a wider scope and offers courses and pursues research in three Fields of Study:

1. **Electric Power System Management;**
2. **Energy Economics and Planning;** and
3. **Energy Technology.**

2. ELECTRIC POWER SYSTEM MANAGEMENT

The objective of Electric Power System Management (EPSM) is to prepare graduates with the knowledge and skill in operational management of power utilities. This field of study covers the emerging issues of evolving electric utility business environment, with its changing levels of uncertainty, regulation and competition. More specifically, it deals with issues in the organization and finance of a power utility, regulatory development, demand-side management, integrated resource planning, power system dynamics, operational planning and power distribution management. A simulation laboratory, supported with the necessary hardware and software facilities, complements the degree program in providing computer tools for power system analysis, simulation, planning, optimization and management.

Preferred Background: For entry to the master degree and diploma programs the preferred undergraduate qualification should be in electrical engineering. Candidates with a bachelor's degree in another engineering discipline, technology and applied science with background/experience related to electrical industry can also apply.



3. ENERGY ECONOMICS AND PLANNING

This Field of Study prepares graduates for positions in economics or planning departments of energy ministries, energy companies, electric/gas utilities, independent power producers (IPPs), energy service companies (ESCOs) or consulting firms. It covers fundamental techniques in energy planning at the national and sectoral levels (e.g., energy demand analysis and forecasting and energy supply system modeling), economic appraisal of energy projects, energy and environmental policy analysis, electricity economics & planning, oil and natural gas economics, energy pricing, environmental considerations in energy planning and emerging issues in restructuring and deregulation of energy industries. The activities of this field are linked with international, regional and national projects on energy economics and planning which provide an appropriate framework for practical training.

Preferred Background: The preferred fields of undergraduate study for candidates seeking admission to the master degree and diploma programs are in electrical, mechanical, chemical, civil or industrial engineering; economics, management and public administration with a relevant energy background. Applicants to the doctoral program should have a good master degree in an energy related field or a field similar to those mentioned above.



4. ENERGY TECHNOLOGY

This Field of Study aims to train graduates for positions in national and international institutions, research and development departments of industries and energy utilities, energy conservation agencies and consulting firms. It has two areas of specialization: **Renewable Sources of Energy (RSE)** and **Rational Use of Energy (RUE)**. The RSE area of specialization encompasses the fundamentals and practical aspects of solar thermal and photovoltaic conversion, thermo chemical conversion of biomass, other renewable energy sources and the environment. The topics covered in RUE area of specialization are fundamentals of energy analysis and system optimization, energy conservation, energy management in industries and clean energy technology. A major emphasis of current research in the Energy Technology Field of Study is on mitigating environmental impacts through RUE and harnessing RSE.

Students of this field can also specialize in the area of **Cleaner Production (CP)**.

Preferred Background: For admission to the master degree and diploma programs, the preferred undergraduate qualification should be in mechanical, chemical, electrical or industrial engineering. Applicants to the doctoral program should have a good master degree in an energy related field or a field similar to those mentioned above.



5. COURSES OFFERED IN THE PROGRAM*

Electric Power System Management Field of Study

Organization and Finance of a Power Utility
Electric Power Systems
Power Systems Design and Operation
Power Systems Dynamics and Stability
Electrification in Rural Areas
Computer Aided Power Systems Analysis
High-Voltage Engineering in Power Systems
Demand-side Management
Integrated Resource Planning for Electric Utilities
Power Distribution Systems
Optimization and AI Applications in Power System
Power Sector Management Under Deregulation
Rural Electrification and Distributed Generation

Energy Economics and Planning Field of Study

Energy Data Analysis
Energy Price Theory
Fossil and Mineral Energy Resources
Energy Demand Analysis and Forecasting
Economics of Energy Projects
Environmental Policy and Management of Energy Systems
Electricity Economics and Planning
Energy - Economic Modeling
Energy Policy and Technology Workshop
Oil and Natural Gas Economics
Nuclear Energy Generation: Technology and Economics
Environmental Economics

Energy Technology Field of Study

Renewable Energy Resources
Biomass Conversion
Electrical Energy Management
Design of Energy Systems
Solar Energy
Efficient Lighting and Day lighting
Energy Management in Buildings
Energy Conservation
Rational Use of Energy in Industry
Solar Design Methods and Applications
Energy Technology Laboratory
Principles of Cleaner Production

- students can select courses within and across fields of study with the consent of the advisor.

6. ADMISSION

Doctoral Program

To be eligible for admission to the doctoral program, a student must have very good academic records (both undergraduate and graduate) and hold a four-year Bachelor degree, and a Master degree, preferably with a combination of course and thesis work, from an institution of good standing acceptable to AIT.

To be eligible for admission to the *external* doctoral program, a candidate must also :

- have access to relevant academic faculties in the area of his/her residence;
- have been in active contact with professional practice for a minimum period of three years since the last degree; and
- have demonstrated a research capability through publications and/or other presentations.

Master and Diploma Programs

To be eligible for admission to the master or the diploma program, a candidate must:

1. hold a bachelor degree (normally from a four-year program) or its equivalent in an appropriate field of study from an institution of recognized standing; and
2. have undergraduate grades significantly above average.

Certificate Program

This program is aimed at middle level professional people with knowledge and experience who require renewal or reorientation in the fields of energy. Candidates for the certificate program are required to be in attendance for a minimum of one academic term and to take not less than nine credits of coursework each term. Certificate students are expected to fulfill all requirements of each course, be assessed and receive a grade recorded on an official transcript. Certificate students are registered as full-time students of the Institute. On completing the program as required, the student receives a Certificate of Attendance. A student successfully completing one or two terms on the certificate program may also request a transfer to the master program.

To be eligible for admission to the certificate program, a candidate must hold a bachelor degree or its equivalent in an appropriate field of study from an institution of recognized standing.

Special Program

In appropriate cases, candidates may be admitted as special students to follow a course or supervised program of study for a short period, normally lasting for less than one term. Any person who is not a regular student and who seeks to register for a course or to be attached to the Institute to do research is required to apply for admission as a special student. Applications for the Special Program status must meet qualifications for admission to AIT and receive approval of the School Dean. Further, special students must complete registration procedures and have received the approval of and confirmation of an available vacancy in course enrollment from the instructor.

Special students must complete registration procedures normally requiring them to hold a bachelor degree or equivalent.

Applications

Students can be admitted to the Energy Program during January, May or September terms. However, the normal closing date for receipt of applications for admission to the master's program for January term is the **1st of May** with internal scholarships. Selection is made based on academic record and by interviews held in some countries.

Applicants must indicate which Field of Study they wish to select: Energy Technology, Energy Economics and Planning or Electric Power Systems Management.

Applications can be obtained by writing to:

Chief Admissions Officer
Asian Institute of Technology
PO Box 4 Klong Luang
Pathumthani 12120 Thailand

Tel: (66-2) 5245031 (Direct)
(66-2) 5160110-44, 5162126 (Operator)

Fax: (66-2) 5246326 (Direct)
(66-2) 5161418 (Operator)

7. FINANCIAL ASSISTANCE

Self- Support and External Support

Applicants for admission should seek support outside the Institute to finance their studies. Most Asian countries have bilateral agreements with partner countries, which include a training component; such components may be used to support study at AIT. International and regional development programs with post-postgraduate training components also offer financial support.

Private sector organizations, too, offer fellowship grants. The Institute is willing to provide early offers of admission to assist candidates to find external funding for their studies at AIT.

Payment of fees and other expenses for self-supporting and externally-funded students can be made on a termly basis or handled as a lump sum grant to be managed by the Institute on behalf of the individual or the donor, as preferred. **The tuition fee for each term must be paid in advance.**

Institute Scholarships

A very limited number of scholarships are available from funds granted to AIT by donors, for which the Institute nominates and selects outstanding entrants. Some of these internal AIT scholarships are restricted to students in particular fields of study, or from particular countries; some are offered for female applicants only.

AIT internal scholarships, available only for the master or doctoral program, are highly competitive, with selection according to academic performance and professional experience. The Institute's scholarship policy is based on the principle that students should meet some or all of the costs of their studies. The institute offers partial as well as full scholarships.

Partial Scholarships / Fellowships

Partial Scholarships may be offered to very good applicants who nevertheless do not qualify for full scholarships.

A partial scholarship will cover part of the student's tuition and fees. The candidate must cover from external or personal funds, the first one to four terms depending upon the fellowship award. The following table gives the payment to AIT.

Fellowship award	To be paid
4 term	US\$ 7,700.00
3 term	US\$10,780.00
2 term	US\$ 13,860.00

Students have to bear other costs, such as:

- Accommodation (standard) at 7,200 baht per term. Please note that there are different categories and rates of on-campus accommodation which should be inquired directly to the Student Accommodation Officer.
- Cost of air travel to and from Bangkok (for non-Thai students)
- Living expenses which ranges from US\$ 900 – 1,200 per term.

Full Scholarships

The number of AIT full scholarships is strictly limited. A full scholarship is intended to meet the basic financial needs of candidates evaluated by the Institute as outstandingly qualified for entry in academic/professional terms. The full AIT scholarship covers tuition and fees, monthly bursary, and single room accommodation on campus. It must be emphasized that the monthly bursary is only a contribution towards the cost of books, food and miscellaneous expenses. Students will find it necessary to supplement this allowance from their own funds.

Given that full AIT scholarships are awarded only to exceptionally well-qualified candidates, applicants should be realistic when deciding whether and how they should complete the financial aid request form.

Assistantships

The Institute's assistantship program is directed towards students requiring part-time employment to help finance their living expenses while at AIT. The positions available are in administration, research or teaching. Students are eligible for employment only after the successful completion of their first term of studies. It must be emphasized that money earned from an assistantship should not be regarded as a regular or complete means of meeting living costs, but the assistantship program is designed to help both the student and the Institute in relevant, mutually beneficial part-time employment.

Duration of Awards

Scholarship awards are made for a specified number of terms of study, normally five for the master and nine for the doctoral program. If, for any reason, a course of study is extended beyond the specified scholarship period, the recipient will be responsible for all costs associated with the extension, unless exemption from payment of tuition and fees has been granted.



8. FEES AND OTHER EXPENSES

TUITION

Students in full-time attendance are currently required to pay tuition and academic fees of US\$ 4,004 per term. Students attending on less than a full-time basis pay fees according to the courses they participate in, at US\$ 352 per credit point per term. All fees are payable prior to registration.

Students on other than the regular degree, diploma or certificate programs, for example on short courses, pay a combined tuition and laboratory fee, determined by the Institute taking into account the resources required to mount the program.

ACCOMMODATION AND LIVING EXPENSES

All students live on campus in a private study-bedroom in a dormitory or student village unit. The charge for dormitory accommodation is equivalent to US\$ 72 per month or US\$ 288 per term.

In addition to the cost of tuition, fees and accommodation, which are payable to the Institute, a student will require funds for text books, for food and other living expenses, and transport and related costs from and to his/her home country. Living expenses depend on individual needs and lifestyle of course, but the student should allow at least US\$ 1,200 per term to cover dormitory accommodation, books, food and so on.



9. FACULTY AND OTHER STAFF

BHATTACHARYA, SRIBAS C., B E (Mech); M E., Roorkee; Ph. D., Cambridge.

Professor (*Bioenergy and Rational Use of Energy*) and **ET Field of Study Coordinator**.

CHIRARATTANANON, SURAPONG, B Eng., University of New South Wales; M Eng. Sc., Monash; Ph. D., Newcastle.
Professor (*Electrical Energy Management*).

KUMAR, SIVANAPPAN, B E (Hons) University of Madras; M Eng., AIT; Ph. D., Institut National Polytechnique, Toulouse.

Associate Professor (*Solar Energy and Rational Use of Energy*).

Program Coordinator

ONGSAKUL, WEERAKORN, B. Eng (EE) Chulalongkorn; MS (EE) Ph.D. (EE) Texas A & M.

Assistant Professor (*Power System Operation & Control, Power System Deregulation*)

and **EPSM Field of Study Coordinator**

SHRESTHA, RAM MANOHAR, B E., M S U. Baroda; B L., Tribhuvan; M Eng., D Eng., AIT.

Professor (*Energy Economics; Energy and Environmental Policy*) and **EEP Field of Study Coordinator**

SINGH, SRI NIWAS, B Tech. (EE), Kamla Nehru; MTech. (EE), Ph.D.(EE), IIT

Assistant Professor (*Power System Restructuring, FACTS, Voltage Security and Stability*)

Adjunct Lecturer:

ATHULA, D. RAJAPAKSE, B Sc, U. of Moratuwa; M Eng., AIT; Ph.D., U. of Tokyo. (*Electric Power Quality, Neural Network & Fuzzy Logic Systems, Photovoltaic Systems, Building Energy Management*)

Adjunct Associate Professor :

LIMMEECHOKCHAI, BUNDIT, M Eng., AIT, D. Eng. Energy Program, AIT (*Energy Management and Integrated Resource Planning*).

MOHANTY, BRAHMANAND, B Sc., SAICE; M Sc., AIT; Ph. D., Institut National Polytechnique, Toulouse.
(*Rational Use of Energy*).

External Expert:

LUDOVIC G. LACROSSE, C. Eng., University of Gembloux, Belgium; EMBA, AIT; D. Eng, University of Gembloux, Belgium. (*Biomass Energy, Cogeneration, Economic Cooperation*)

EC-ASEAN COGEN Program Coordinator

Other Staff

EDGER FERIL BESANA, BSEE, Cebu Institute of Technology, Philippines; M Eng, AIT (Energy Economic)
Research Professional

RABIN, SHRESTHA, BE, M.N.R. Engg. College, India, MSc University of Surrey, UK, D. Eng, AIT. (*Energy Economics*)
Research Specialist

THIROMI R. RAJAPAKSE, B Sc. U. of Moratuwa; M Eng., AIT (Electric Power System Management)
Laboratory Supervisor



10. RESEARCH AND OUTREACH ACTIVITIES

In the field of Energy Technology, research in Renewable Sources of Energy includes renewable energy and environment, solar thermal and photovoltaic processes, daylighting and biomass conversion. Research areas in Rational Use of Energy include assessment of cogeneration in different types of industries, rational use of energy in industry, and energy management in buildings.

In the Energy Economics and Planning field, the research focus is on energy demand analysis, energy economics, energy supply planning and policies with emphasis on electricity generation planning, energy pricing, power sector performance; and power sector deregulation. More recently, emphasis is on environmental implications of energy demand and supply, energy-environment planning strategies for mitigation of global warming and acid rain precursors.

OUTREACH

Energy Program conducts training courses, regional and international workshops, seminars and conferences in addition to regular academic and research activities.

Regional Energy Resources Information Center (RERIC)

The Regional Energy Resources Information Center (RERIC) was established in 1978. RERIC collects, repackages and disseminates information on energy conservation, energy planning, renewable sources of energy, and electricity generation, transmission and management. Over the years, RERIC has established and developed a computerized database system on its subject coverage, which is accessible through the Internet. RERIC publishes the biannual *International Energy Journal* and the quarterly *Energy and Environment (EE) News*. Occasional publications include conference/seminar /workshop proceedings, research reports, directories, environment systems reviews, and do-it-yourself manuals. RERIC also offers information retrieval and document delivery services as well as design, layout, and editing of reports, reviews, proceedings, journals, newsletters, brochures and other publications.

EC-ASEAN COGEN Programme (Phase III)

The EC-ASEAN COGEN Programme (COGEN III) is an economic cooperation programme between the European Commission (EC) and the Association of South East Asian Nations (ASEAN). It is funded by the EC and coordinated by AIT.

The main objective of the third phase of COGEN is to accelerate the implementation of proven, clean and efficient cogeneration technologies using biomass, coal and gas as fuels within the industrial sectors of the ASEAN region. This should be achieved through partnerships between European and ASEAN companies.

The programme uses a wide range of mechanisms to support economic co-operation in this area, including (but not limited to) the co-financing of suitable demonstration projects.

11. LABORATORY AND ENERGY PARK

Facilities available in the Program include standard laboratory apparatus for the study of heat transfer, refrigeration, fluid mechanics, combustion, etc. There is also a considerable inventory of equipment for instrumentation and measurement, and a good micro-computer laboratory.

A well-equipped thermal and photovoltaic laboratory having a large outdoor testing area known as the Energy Park is used for teaching, research and the testing of commercial products. The park contains solar, wind and bio-energy devices.

There are a number of computer modeling softwares available for energy planning and policy analysis in the Program. These include Model for Analysis of Energy Demand and Environmental Impacts (MAED, MEDEE-S/ENV, LEAP), Electricity System Planning (WASP-III Plus, ENPEP, DECPAC), Energy - Environment Flow Optimization Model (EFOM-ENV), Wood Energy Planning Models, Energy - Environmental models for estimation of impacts of energy externalities, air pollution emission and dispersion and climate change (CO₂ DB, RAINS, TEMIC, ECOSENS, ISC), Energy - Environmental Database Management Software (DBA-VOID), Transient System Simulation Program (TRNSYS) and Engineering Equation Solver Software (EES).

The EPSM simulation laboratory plays an important role in providing a platform for practical work to complement lecture instruction, research and outreach. It contains computing facilities for operational planning, analysis, transient dynamic simulation, long-term planning, demand-side management, high voltage engineering, financial management and maintenance management.

In addition, the Program maintains an energy-environmental database for Asia that provides key information for the execution of sponsored projects.

12. ABOUT AIT

The Place and Its Context

The Asian Institute of Technology (AIT) originated in 1959, then as a new post-graduate university, working to meet the growing need for advanced technological education in Asia. The Institute's academic programs focus on the problems of the region and their engineering, scientific, planning and management solutions.

AIT, situated about forty kilometers north of Bangkok, Thailand, has a well planned and landscaped campus, purposely designed for teaching and study, with good provision for research, whether in the laboratories, the computer center or in the field. There are dormitory student villages, and conference-center accommodations, and excellent sports facilities. AIT can offer only very limited married student accommodation with priority given to doctoral students.

In the attractive AIT setting, students from around forty countries, mainly Asian, learn and live together with faculty, research and support staff from as many nations worldwide. English is the medium of all instruction and written work, as well as the official administrative language.

FOR MORE INFORMATION...

For further information regarding the Energy Program, its facilities and activities, please visit the website at <http://www.serd.ait.ac.th/ep/ep.html> and at <http://www.ait.ac.th> for AIT and its activities.

ENERGY PROGRAM

School of Environment, Resources and Development

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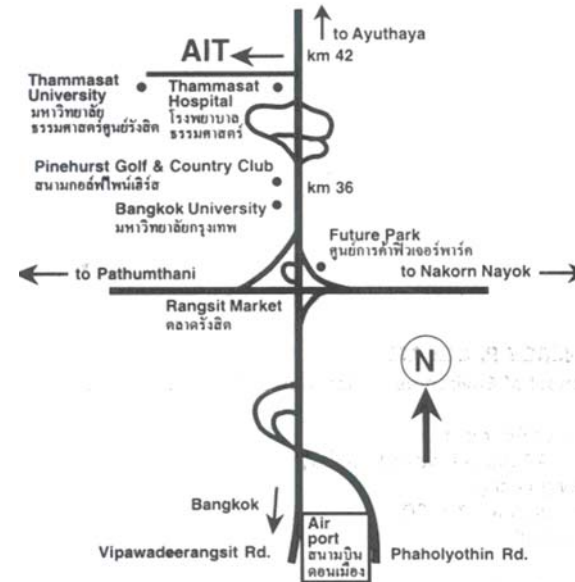
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