

Energy Commodity Trading & Financial Engineering



<http://gsim.unist.ac.kr>

Best competitive, global energy trader!

From the energy supply chain including production, refining, storing and sales, to the energy finance such as investment in E&P, structured trade & commodity finance, and derivative instruments, the world is already a huge energy commodities market. Be a competitive global energy trader to lead the global market with UNIST energy commodity trading and financial engineering program.

This program is supported by the Ministry of Trade, Industry and Energy from 2016 to 2020 and by Ulsan Metropolitan City from 2015 to 2021.



Mission

UNIST Graduate School of Technology Management is committed to interdisciplinary education in the English-speaking environment, and to pioneering research across all its disciplines in order to cultivate competent leaders with a global perspective and an innovative capability to excel in the theory and practice of both business and technology management.

Vision

To become a world-class business school with an emphasis on technology-based management.

Values

- Creativity through developing interdisciplinary knowledge in both management and technology
- Global awareness
- Innovative and entrepreneurial spirits
- Excellence in research and teaching
- Leadership and teamwork
- High Standards of ethics

Strategies

- Attract quality students
- Recruit/retain top class faculty
- Continuous improvement and expansion of programs
- Enhance quality and effectiveness of teaching
- Cultivate high quality research
- Strengthen financial resources to support mission
- Emphasize globalization
- Emphasize students' creative and innovative thinking
- Cultivate higher level knowledge in specialized industries



Energy Commodity Trading & Financial Engineering Program

The Energy Commodity Trading & Financial Engineering (hereafter ECTFE) is not only a professional curriculum to predict the factors that affect the energy commodity markets, but also recognized as a first Korean PSM program. We educate the knowledge and technology of energy commodity trading such as energy value chain, investment, risk management, and financial engineering. Through an expert lectures, exceptional quality and variety of international cooperation programs, we support students to grow as global professional traders.

Career Paths

Financial management of the energy companies, energy trading department of finance companies, energy industry-related projects, experts in various fields on energy trading and risk management.

Certified interdisciplinary program with various professional and practical education

Well organized interdisciplinary program

- The unique interdisciplinary program focused on energy supply chain and financial engineering skills.
- First certified PSM program in Korea.



What is the 'PSM' program?

PSM(Professional Science Master's) is the Science Plus course which is a combination of management related fields such as natural science and mathematics, technology and engineering and management foundation based on computer science, policy, finance, organizational behavior, etc. We will train experts in science and technology management with a high management mind-level, such as entrepreneurship.

Prominent faculty with practical skills

- Experienced full-time faculty members such as quants, traders, fund managers, and risk managers.
- Practical lectures by former/present global oil traders and consultants.

Powerful network with related institutions

Cooperation in education with global and national institution such as Argus, KNOC, SMU and Cass Business School.

Leading role in Northeast Asia Oil Hub project

Responsible for leading "Northeast Asia Oil Hub" project with MOTIE, KNOC and Ulsan City.

International program, cooperate with global companies and universities

Energy Trader Professional Program

UNIST has established a course that specializes in the energy sector every year. Based on a cooperative relationship with global energy prices and trading companies (Argus, etc.), managers from each company is invited every year and lecture directly to provide a realistic sense of the international trends and the current situation.



Argus, which was founded in 1970, is leading provider of data on prices and fundamentals, news, analysis, consultant services and conferences for the global crude, oil products, natural gas and so on. They provide a report on energy and apply as teaching materials.

Dual degree program with Cass Business School, London

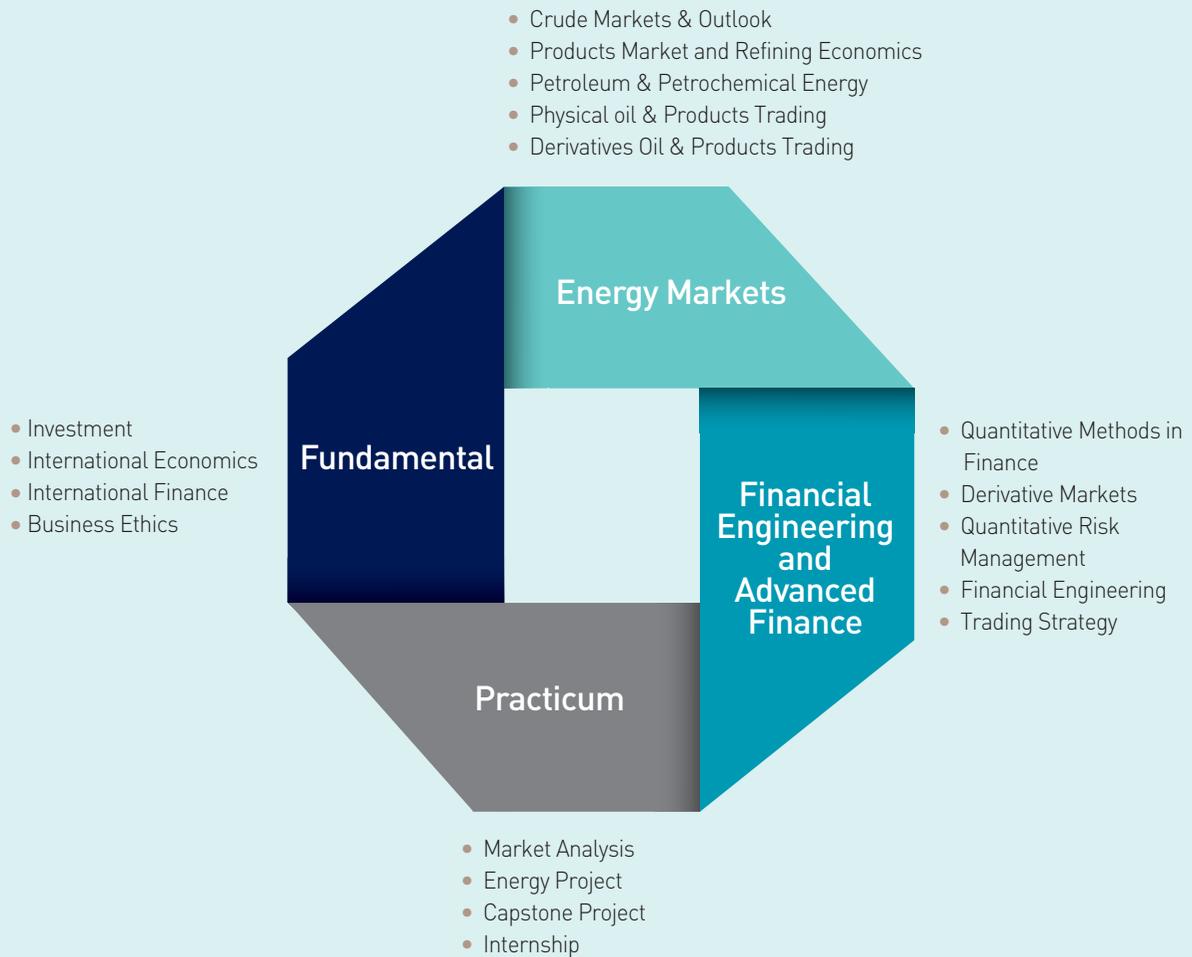
ECTFE program have active student exchange program with Cass Business School of London, which is recognized three major business schools in London.

Student who visits as an exchange student can be received dual degree program at Cass Business School after competing their lecture and education.

(This program is applied to 2017's Freshman.)



Curriculum & Course Description



Course Description

ECT503 International Economics

This course provides an overview of international macroeconomics. The first part of the course will introduce main concepts and theories about a country's exchange rate, trade balance and national income/output determination. The second part will combine these theories to build an integrated analytical framework to analyze world (macro) economic issues. In the last part of the course, we will apply the developed framework to several episodes of global economic events in the history.

ECT515 Investments

This course introduces the basic principles in investments such as diversification, no arbitrage principle for security valuation, equilibrium asset pricing models such as CAPM, and factor models. This course further investigates fundamental valuation for commodities, fixed income securities, and contingent claims.

ECT516 Derivative Markets

This course introduces the basic features of futures and options. The course elaborates several approaches of pricing derivative securities such as binomial and trinomial option pricing, Black-Scholes formula, implied binomial trees. In addition, this course focuses on trading strategies of futures and options.

ECT517 Quantitative Risk Management

The course investigates core principles of risk management, particularly market and credit risk management using Value at Risk (VaR) and introduces other recent risk management tools.

ECT518 Financial Engineering

This course is for the student who is interested in modeling the derivatives. The general quantitative finance will be excluding mathematical proofs. All the theoretic explanation will be implemented with the Microsoft Excel for the practical uses the class.

ECT523 International Finance

This module analyzes various issues that arise in an international corporate environment. The course covers topics such as : international and locational arbitrage strategies ; exchange rate determination theories and forecasting; exchange risk management; international portfolio; and MNC's financial structure, cost of capital and sources of finance.

ECT524 Quantitative Methods in Finance

This course introduces financial time series analysis, basically. Students study on linear models for financial time series and case studies with those. It will be applied to volatility models, high frequency financial data, and Value at Risk. For the preliminary understanding, it will be started from the basic knowledge on statistics and linear regression methods. All analysis will be implemented with R.

ECT528 Trading Strategy

Statistical programming such as SAS, R project, and Python is widely used in trading strategies in financial industry as well as in financial academic research. This course introduces basics of the statistical programming along with database management skills, and then provides applications of these tools to many financial economics problems such as trading strategies, optimal portfolio choice, risk managements and etc.

ECT533 Petroleum & Petrochemical Engineering

The course is designed to overview of petroleum, refining and petrochemical products. A brief description of how to produce crude oil, Petroleum fuels, such as gasoline and diesel for all transportation vehicles. Petrochemical products and commodities derived from petrochemicals, for example, plastics, rubbers and synthetic fibres are also introduced.

Throughout this course, students will have opportunities to learn and discuss 1) how petroleum fuels and petrochemicals are manufactured, 2) how to add values to the products 3) how to manage and transfer petroleum products.

ECT551 Crude Markets & Outlook



This course will provide students with a historical perspective on the crude oil markets, the impact that crude oil's properties have on its price, crude oil production economics, how policy changes have impacted the demand for crude oil and processing technologies and the role played by logistics and transportation to the cost of crude oil.



ECT552 Products Market and Refining Economics

This course is designed to provide participants with an understanding of the characteristics of the refined products, their key areas of use and how environmental concerns have driven refined product specifications. Given the backdrop of the dynamics of the refined products markets and discussion of refinery technology, the fundamentals of refining economics will be discussed.

ECT555 Physical oil & Products Trading



This module will provides the fundamental knowledge of international energy trading. The aim of the module is to help students understand volatility, counterparty exposures, credit requirements, government regulations, unexpected events and geopolitics keep traders in a perpetual state of high alert. This module includes understanding the risk management in oil & gas trading, OTC markets & exchanges and paper instruments in oil trading.

Course Description

ECT556 Derivatives Oil & Products Trading

This module will provide the fundamental knowledge of international energy trading. The aim of the module is to help students understand volatility, counterparty exposures, credit requirements, government regulations, unexpected events and geopolitics keep traders in a perpetual state of high alert. This module includes understanding the risk management in oil & gas trading, OTC markets & exchanges and paper instruments in oil trading.

ECT692 Market Analysis

In this course, students will read reports on a selected financial market written by analysts working on several financial institutions and make their own reports.

ECT694 Capstone Project

In this course, students will simulate their own selected role in the financial market. They can choose dealer, quants, analyst or sales as their role.

ECT695 Energy Project

In this course, students will take a project which is related to the energy market. They can develop their ideas on energy market and participate into real projects funded by public or private institution.

ECT561 Internship

Students will work for commodity trading desks (front, middle, and back offices) in the petroleum companies, banks, and trading firms. They will learn entry-level knowledge and practices to become traders, risk managers, and analysts.

MGT521 Business Ethics

The purpose of this course is to enable students to reason about the role of ethics in trading and contracting in the energy commodity trading and financial market. In the course, students will participate in a series of case study discussions, focusing on analyzing the issues in moral terms and then making decisions and developing a set of reasons why the decision can ethically be justified. During the discussion, additionally, students will think about the impact of their financial transactions on stakeholders and societies.



Our distinguished faculty who combines theory and practical skills

Best prominent faculty makes the systematic education based on the latest information and theory.

- **Jung, Mooyoung** Ph.D., Industrial Engineering, Kansas State University
- **Jung, Kooyul** Ph.D., Accounting, University of Florida
Dean of School of Business Administration
- **Kim, Dong Seop** Ph.D., Manufacturing Engineering, Ohio State University
Former Head researcher of Shell laboratory /
CTO of SK Innovation
- **Kim, Daejin** Ph.D., Finance, Vanderbilt University
former Fund Manager
- **Seo, Byoung Ki** Ph.D., Mathematics, KAIST
ECTFE Coordinator, former Quant/Trader
- **Lee, Junyoun** Ph.D., Finance, Texas Tech University
- **Jang, Hyun Jin** Ph.D., Mathematical Science, KAIST
former Quant/Risk Manager
- **Chung, Keunsuk** Ph.D., Economics, University of Washington

ECTFE Curriculum Advisory Board

ECTFE Curriculum Advisory board is composed of experts of national and international oil trading agencies. Curriculum is consulted and created from various renowned field and work expertise.

- **Ha, Sungki** (CEO of Kyungsang-Ilbo)
- **Cha, Uihwan** (Vice-President of The Chamber of Commerce and Industry)
- **Shin, Ingil** (Head of Production Management Division of SK Energy)
- **Kim, Gyeongwon** (Executive director of Engineering headquarters of SK Energy)
- **Mazlan Razak** (Argus Principal-Petrochemicals-Asia & the middle East)
- **Neil Dsouza** (Argus Senior Manager-Consulting)
- **Kevin Wright** (Argus VP Asia-Petroleum Products)
- **Tom James** (Argus Associate Consultant)

Beyond the Program

UNIST International Trading Conference(ITC) on ECTFE

UNIST International Trading Conference is to explore the role and possibility in Ulsan as a center of energy commodity trading in accordance with the Northeast Asia Oil Hub building. It started in 2011, and invited the global scholars and experts in the field of energy commodity trading and financial engineering proceeding in other areas every year. UNIST International Trading Conference plays active academic exchanges of energy oil market and the role of a bridgehead for the research activity of the related fields as well.



Introduction of the Trading Practice Program; RIT (Rotman Interactive Trader)



The UNIST ECTFE Program introduced a trading practice program; **RIT(Rotman Interactive Trader)** of Rotman School of Management-University of Toronto for training student's sense of trading.

UNIST is the only university in Korea that has supported the student, who has been chosen, to participate in the Rotman International Trading Competition, which is held annually.

From 2017, UNIST co-organized the **Rotman-UNIST Trading Competition** with the University of Toronto, targeting undergraduate and graduate students in Korea. Many Korean students and international students have participated in this competition and they are given an opportunity to experience the trading simulation.



Various Support and Benefit for Successful Academic Career

Students focus on academics because GSIM operates a special student support system.

Scholarship

- Full scholarship can be provided for freshmen in the first semester.
- Scholarship can be provided for the qualified students (provided 97% as of spring semester 2016)
- Students who are chosen as TA in each semester can be provided a monthly TA allowance.
 - Students living expenses can be partially provided.

Practical Support

- Various practical activities will be supported such as attending a conference, global certificate course, field trip, etc.

Dormitory

- Dormitories are available for UNIST students.

PSM Degree

- Grant a PSM(Professional Science Master) degree.
- Certified as an energy trader on behalf of the Ministry of Trade, Industry and Energy.



Optimized curriculum for the practice and theory of energy industry

What differentiates ECTFE from others is the curriculum optimized for the theory and practice of energy industry. ECTFE program provides students with the opportunity to join domestic and overseas field trips, not just classes at school. During the ECTFE graduate program, I was able to enhance quantitative analysis skills for energy commodity industry.

Enrolled in 2015 Lee, Sang-U

An easy way to access the expertise knowledge in energy and derivatives

It was a great degree program due to the knowledge that I was able to acquire regarding the international finance field, derivatives, and energy industries. Moreover, the degree program is well organized and designed to make the students to become professionals with this specialized field. Through this program, you will be able to acquire not only the PSM degree but also it will widen your insight.

Enrolled in 2015 Jeong, Jun Yeong

You can attain information, knowledge, and the practice via course!

It is possible to learn both theory and practice with equal exposure. Specialized domestic and foreign lecturers who are active in their fields makes us not only experience practical but also gain a variety of perspectives to see the global trend. Systematic curriculum and good teaching environment where you can learn the knowledge and technology at the same time, I recommend the course.

Enrolled in 2014 Cho, Seon Hyeong



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