INTERNATIONAL SCHOOL FOR GEOSCIENCE RESOURCES (IS-Geo)
KOREA INSTITUTE OF GEOSCIENCE AND MINERAL RESOURCES (KIGAM)

Regular Training Course on

PETROLEUM EXPLORATION, DEVELOPMENT AND PRODUCTION

The **International School for Geoscience Resources** of KIGAM presents a training course on ***Petroleum Exploration, Development and Production***. The course will take place at the Ara room of International School for Geoscience Resources of KIGAM in Daejeon (Korea) in **February 5 through March 7, 2014** and will include the following topics:

Module	Date	Main Instructor
Module 1. Petroleum Economics	Feb. 5 - 7	Dr. Younkyoo Kim (Hanyang University)
Module 2. Petroleum & Reservoir Geology	Feb. 10 – 13	Dr. In-Gul Hwang (KIGAM)
Module 3. Reservoir Geophysics and Petrophysics (including visit to MOFA)	Feb. 14, 17 – 21 (Feb. 19)	Dr. Gwang Hoon Lee (Pukyong National University)
Module 4. Petroleum Engineering	Feb. 24 - 28	Dr. S.M. Farouq Ali (University of Calgary)
Module 5. Unconventional Resources (including the Country Report)	Mar. 3 - 7 (Mar. 7)	Dr. Hyundon Shin (Inha University)

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Ministry of Science, ICT and Future Planning

COURSE INFORMATION

• Agenda

- This course aims to cultivate skillful experts and meet training needs in the field of petroleum geology and engineering.
- This course will provide an introduction to key aspects of energy resources related to the petroleum industry. This course will also include a general overview on petroleum economics. Students will then be challenged with empirical examples to expand their capabilities and understanding.
- The contents of this course comprise general introduction of petroleum geology, geochemistry & geophysics, petroleum engineering & unconventional resources. One of topics in this course is on geological and engineering concepts for developing unconventional gas. The course covers the fundamentals of drilling engineering and well completion. The course will include several reservoir evaluation techniques such as volume in-place and reserve estimation.

• Course Requirements: Prerequisite

- Knowledge of the general organic chemistry, mineralogy and geology
- Understanding of sedimentology and stratigraphy
- Basic knowledge of mechanics of materials or structural geology
- Knowledge of the basics of oil and gas development process and unconventional resources

• Who should Attend?

- This course is designed for scientists or engineers involved in petroleum industry as well as students who are interested in working for the petroleum economics, geology & engineering.
- This course is also suitable for geologists, petrophysicists, geophysicists, engineers, managers & professional technicians.
- Some of topics are designed for scientists or engineers involved in petroleum engineering who want to improve their understanding on the reservoir geomechanics including hydraulic fracturing and wellbore stability.

• Summary of topic contents and learning objectives

Module 1. Petroleum Economics

- **Overview of Petroleum Industry (February 5) by Dr. Younkyoo Kim (Hanyang Univ.)**

  This topic examines economic and political theory, empirical perspectives, and political economy of energy supply and demand. It discusses aspects of

local, national, and global markets for oil, natural gas, coal, electricity, nuclear power, and renewable energy; and examines public policies affecting energy markets including taxation, price regulation and deregulation, energy efficiency, and control of emissions.

- Overview: Global energy supply and demand
- Is unconventional energy the answer to peak oil?
- Does the US have more oil than Soudai Arabia?
- The 21st century goldrush: shale gas revolution
- The LNG market in the Asia-Pacific

- **Petroleum Economics (February 6) by Dr. Jinsoo Kim (Hanyang Univ.)**

Economic and financial aspects of petroleum (oil and gas) assets will be covered in this course. Through the course, students will understand the basic theories on the features of energy projects, discounted cash flow method, risk analysis, international oil and gas markets, and economics of energy sources.

- Energy projects and DCF
- Financing and decision making
- Risks in energy projects
- International markets and economics of energy sources

- **Investment on Shale Gas Revolution – Where to go, When & How (February 7) by Mr. Heejun Park (CEO of Energy Innovation Partners (EIP))**

This course will cover how to find the right opportunity on Shale Gas Revolution. Throughout the course, attendees can learn the fundamental of shale gas revolution, shale gas value chain, new trend on investment of shale gas revolution and midstream deal analysis. Also, attendees can learn M&A knowledge, experience and skills from various case studies – led by Heejun Park (ex-Vice President of Planning & Process Implement at EQT Corp., a S&P500 company in US)..

- Overview of recent M&A transactions regarding the shale gas revolution
- New Trend of Shale Gas Revolution – by Key Words
- Investment Technique: Where to go? When & How?

- Oil and Gas Value Chain – Upstream, Midstream, Downstream
- Case Study
  - Case study: Kinder Morgan's TGP 300 Pipeline
  - Case study: EQM IPO
  - Case study: US Propylene Plant vs. Chinese Propylene Plant
  - Midstream Deal Analysis: EBITDA Multiple History
- Conclusion and Q&A

Module 2. Petroleum & Reservoir Geology

- **Sandstone Reservoir (February 10) by Dr. In-Geol Hwang (KIGAM)**

  The sandstone reservoir topic includes the reservoir related physical character of sand grains, depositional processes and sedimentary structures formed by current and sediment gravity flows. This course also includes sedimentary facies of various depositional environments from alluvial fan to deep sea environments

  - Reservoir related sedimentology
  - Sedimentary processes and structures
  - Facies model of alluvial fan, fluvial, deta and lake environment
  - Facies model of clastic shoreline
  - Facies model of deep sea environment

- **Carbonate Reservoir (February 11) by Dr. Suk-Ju Choh (Korea Univ.) & Dr. Yi Kyun Kwon (Kongju Nat' Univ.)**

  This topic provides an overview of carbonate sedimentology and petroleum geology, including carbonate depositional environments, sedimentary facies and play types in carbonate rocks, and diagenesis. By the end of this topic, participant can be able to understand the following:

  - *Limestone forming components and classification*
  - *Facies model of typical carbonate depositional environments*
  - *Principal Plat Types in Carbonate Rocks*
  - *Diagenesis of calcareous sediments*
  - *Dolomitization*

  - Carbonate and evaporate sedimentation
  - Carbonate depositional environments

- Carbonate and hydrocarbon reservoir
- Carbonate systems
- Changes in carbonate sediment supply, systems and sea level
- Carbonate sequence stratigraphy

- **Basin Analysis (February 12) by Yong Il Lee (Seoul Nat' Univ.)**

  This course will provide an introduction to key aspects of basin analysis related to the petroleum industry. The contents of this course comprise general introduction of plate tectonics and associated sedimentary basin types, sedimentary basin-fills and their spatial and temporal relationships, trapping mechanisms for oil and gas, and application of basin analysis to petroleum exploration.

  - Plate tectonics and sedimentary basins
  - Basin-fills - Data acquisition
  - Basin-fills - Facies and stratigraphy
  - Trapping mechanisms for oil and gas
  - Application to exploration

- **Petroluem Geology & Geochemistry (February 13) by Young Joo Lee (KIGAM)**

  Petroleum geochemistry course provides basic overview of composition and characteristics of petroleum and organic matter. And this course explains the principles of the formation of oil and gas from organic matter (kerogen & biomarkers) Different geochemical analytical methods of petroleum will be elucidated. Finally this course will benefit to be familiar with the geochemical techniques and the interpretation of geochemical results. Migration of petroleum and trapping mechanism will be included in this course.

  - Composition and characteristics of petroleum
  - Characteristics of organic matter
  - From Kerogen to Petroleum
  - Biomarkers
  - Analytical methods of Source Rocks
  - Petroleum Migration & Trap

Module 3. Reservoir Geophysics and Petrophysics

- **Petrophysics (February 14) by Young-Seuk Keehm (Kongju Nat' Univ.)**

  This course will cover general information on petrophysics including physical properties of reservoir rocks and petrophysical parameters from well logging/core analysis. It will also cover overviews on pore-scale details and their impact on rock properties and simple modelling techniques (rock physics models) for reservoir characterization. First half of the course will covers general petrophysical parameters and their measurement techniques. During the latter half of the course, we will explore pore-scale details of rocks and their impact on change in physical properties of rocks. And a simple modelling techniques to characterize reservoirs rocks using petrophysical parameters.

  - Introduction of petrophysics
  - Petrophysical parameters
  - Physical properties of rocks
  - Core analysis
  - Pore structures and property estimation techniques
  - Rock physics modeling and fluid substitution

- **Seismic Interpretation (February 17-18) by Gwang Hoon Lee (Pukyong Nat' Univ.)**

  The students will have hands-on exercises using the IHS Kingdom software, which will introduce modern interpretation techniques and tools.

  - Seismic reflection basics
  - 2D and 3D seismic data interpretation
  - Seismic attributes

- ***Culture Trip with visit to MOFAT (February 19)***

- **Well Logging (February 20) by Bo-Hyun Chon (Inha Univ.)**

  In this course, students will learn basic methods to: 1) determine porosity and lithology of rock, 2) determine water saturation and 3) evaluate potential hydrocarbon producing zone by analysing information obtained from well logs. After briefly review the fundamentals of log interpretation

and logging tools, students will learn basic methods to determine porosity, lithology and water saturation. Interpretation of shaly formation and analysis of gas formation will be covered to evaluate the potential hydrocarbon production formation properly.

- Basic principles
- Types of logging tools
- Determination of porosity and lithology
- Determination of water saturation
- Interpretation of shaly formation
- Analysis of gas formation

- **G&G Model (February 21) by Minki Kim (Schlumberger)**

  The course reviews the full spectrum of an integrated reservoir study. It addresses the practical requirements and workflows for modern 3D reservoir characterization. Participants learn how to use deterministic and stochastic modeling methodologies to quantitatively integrate diverse data types, model reservoir heterogeneity, assess model uncertainty, and prepare the reservoir model as input to a flow simulator. Particular emphasis is placed on the best modeling practices and data integration methodologies available within current modeling softwares.

  - G&G data feature and practical data loading process
  - Data preparation of geological modelling
  - Basic geostatistics
  - Overview of geological modeling process
  - Example of geological modeling (with Petrel)

Module 4. Petroleum Engineering

- **Reservoir Engineering (February 24-25) by S.M. Farouq Ali (U of Calgary)**

  This course is an introduction to petroleum reservoir engineering, including well testing and reservoir modelling. Principles will be illustrated through simple examples.

  - Fundamental Reservoir Engineering
  - Reservoir fluid and PVT behaviour

- Drive mechanisms/ Material balance
- Fundamental well test analysis
- Reservoir modelling and simulation

o **Enhanced Oil Recovery (February 26) by S.M. Farouq Ali (U of Calgary)**

The general aspects and experience with enhanced oil recovery will be covered. Principles will be illustrated through simple examples.

- Introduction to EOR processes
- Primary and secondary recovery phase
- Miscible, chemical and thermal methods
- New technical challenges

o **Drilling & Completion (February 27-28) by Dae Sung Lee (Dong-a Univ.)**

This course covers all aspects of drilling technology, emphasizing both theory and practical application. The course provides all the fundamentals necessary to drill a well whether it is shallow well or a complex, high pressure well. The course provide introduction to many fundamental of completion and intervention technology. This course also focuses on the practical aspects of each of technologies, major well design, diagnostic and intervention technologies using design examples.

- Drilling system
- Drilling geology
- Drilling rig & rig selection
- Drilling cost control
- Hole problems
- Drilling fluids
- Drill bits
- Casing & cementing
- Directional drilling
- Well control
- Completion
- Well design

Module 5. Unconventional Resources

- **Unconventional Gas (March 3-4) by Wonsuk Lee (KIGAM) and Ki-Bok Min (Seoul Nat' Univ.)**

  Firstly, this topic will provide fundamental information about unconventional gas especially CBM (coalbed methane) and shale gas. The main emphasis is on geological and engineering concepts for developing unconventional gas. The topic also covers several reservoir evaluation techniques such as volume in-place and reserve estimation. The introductory part includes worldwide trend and activity of unconventional gas development. Several sections are devoted to geological and engineering concepts for unconventional gas development. Finally several evaluation techniques will be introduced.

  Secondly, this topic will provide an introduction to hydraulic fracturing and the fundamentals of reservoir geomechanics which are essential for unconventional resources. With focus on the fundamentals, the content covered in this topic can be applied to both conventional and unconventional resources. The objective of this part of topic is to provide participants with fundamental understanding on hydraulic fracturing technology and reservoir geomechanics.

  - Feature of unconventional gas (CBM)
  - Feature of unconventional gas (Shale Gas)
  - Fundamentals of reservoir geomechanics
  - Wellbore stability analysis
  - Principles of hydraulic fracturing

- **Unconventional Oil (March 5-6) by Hyundon Shin (Inha Univ.)**

  This course will provide an introduction to the unconventional resources and the problems and issues in developing oil sands and heavy oil. During the course, some cases of field applications will be demonstrated and discussed. Some contents will be covered during the course, but students will be encouraged to develop their own problems at the end of the course. Day one will cover the fundamental of thermal recovery processes, in-situ

recovery processes, and Day two will finish with field application of oil sands development and numerical simulation.

- Introduction to unconventional oil
- Fundmental of oil sands development
- Oil sands in-situ recovery method
- Introduction to SAGD process
- SAGD field application
- Heavy oil recovery processes

o ***Country Report Presentation (March 7)***

About the instructor – *Dr. Younkyoo Kim*

Prof. Younkyoo Kim is Director of Hanyang University's Institute for Energy Governance and Security (EGS). The institute specialises in Asia's role in the global energy governance and energy security. With so much attention being placed on unconventional gas like shale gas, Younkyoo Kim (Professor, International Studies) was recently invited to attend the Energy China International Shale Gas Forum as a consultant. He established the Institute for Energy Governance and Security, Korea (EGS Korea) to conduct research on energy, international governance, and technology based on converged education. Kim majored in International Relations and Political Science, and he has been studying Northeast Asia, particularly Russia, and energy for more than 20 years. He is the author and co-author of over 30 scholarly articles and monographs, and the author or editor of 4 books, including The Arctic: A New Issue on Asia`s Security Agenda (2011), Recent Trends in Russian Energy Policy In Asia (2011), and Russia and the Six-Party Process in Korea (2010).

About the instructor – *Dr. Jinsoo Kim*

My research field mainly concerns the econometric analysis of the energy and mineral markets, energy input-output analysis, and engineering economics for energy and minerals. I have taught Resource Market Analysis, Engineering Economics for Resources, and Resource Economics and Policy in both undergraduate and graduate courses. Recently, I managed a research project entitled “Economic Analysis on Coalbed Methane (CBM) Production” with KOGAS.

About the instructor – *Mr. Heejun Park*

Mr. Heejun Park is the CEO of Energy Innovation Partners (EIP), the first energy consulting & M&A advisory company focusing on shale energy investments for Korean investors. He created EIP as a joint venture with Energy Holdings Group (a leading energy consulting firm in Korea, www.perotrust.com) in May 2013. Before founding EIP, he worked at EQT Corporation for 12 years. EQT is an S&P 500 company with a market value of USD 14 billion and is a leading integrated energy company focused on Marcellus/Utica shale. He was a vice president at EQT and was in charge of Planning and Process Improvement (similar to M&A department). At EQT, he gained various experiences including M&A execution, capital management and strategic planning. He earned an MBA from Carnegie Mellon University, Tepper School of Business.

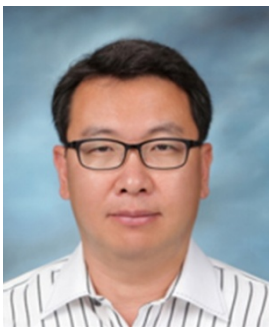
About the instructor – *Dr. In Gul Hwang*

Dr In Gul Hwang is the principal researcher in Petroleum and Marine Division, KIGAM, and professor of University of Science and Technology. He studied sedimentology and genetic sequence stratigraphy of fan delta systems in Miocene Pohang Basin based on fieldwork. After he joined KIGAM, he acted as a petroleum geologist. He is also interested in seismic interpretation, assessment of petroleum resources and economics. Hwang consulted with government and many Korean private companies, investing overseas petroleum assets. He is, now, teaching students in University of Science and Technology and has many fieldwork lecture courses such as Pohang Basin, Gyeongsang Basin, Gyeokpo and Wido Basins. Students from other universities as well as petroleum geologists and engineers from many companies enjoyed his fieldwork lecture course.

About the instructor – *Dr. Suk-Joo Choh*

Dr. Suk-Joo Choh is an associate professor of Earth and Environmental Sciences at the Korea University. Dr. Choh studied carbonate rocks at the University of Texas at Austin, where he specialized in constituents and depositional environments of the Carboniferous algal buildups which are potential reservoir facies in the subsurface of south-western United States and Kazakhstan. He is also interested in application of information technology toward geoscience education and co-authored AAPG digital publications of sandstone tutorial (Milliken et al., 2007) and carbonate petrology tutorial (Milliken and Choh, 2011). Dr. Choh and his colleagues are currently pursuing early Phanerozoic (Cambrian-Ordovician) reef development patterns around the western margin of Gondwana supercontinent from the Taebaeksan basin of Korea, Yushan area of South China and near Xian of western China.

About the instructor – *Dr. Yi Kyun Kwon*



Dr. Yi Kyun Kwon is an associate professor of Department of Geo-Environmental Sciences at the Kongju National University. Dr. Kwon specialized in sedimentology and stratigraphy in carbonate rocks, and seismic stratigraphy in East Sea, Korea. Recently he expanded his research topic to petroleum geology, especially oil sand geology, and to geology of carbon storage. He is now teaching about sedimentology and stratigraphy as well as petroleum geology, including sequence stratigraphy. His current major

research topics are (1) site selection for carbon storage and geological characterization of storage formations in Korea, and (2) refinement of sequence stratigraphy and paleogeographic reconstruction of the Lower Paleozoic carbonate platform sequences.

About the instructor – Dr. *Yong Il Lee*

Prof. Yong Il Lee is currently Professor of Geology at School of Earth and Environmental Sciences, Seoul National University and specializes in the study of sedimentary geology and paleoclimatology. He studied geology (B.S. and M.S.) at Seoul National University and received his Ph.D. at the University of Illinois at Urbana-Champaign, USA. He has been at Seoul National University since December, 1985 and has written more than 165 peer-reviewed scientific articles, most of them in international journals.

About the instructor - *Dr. Young-Joo Lee*

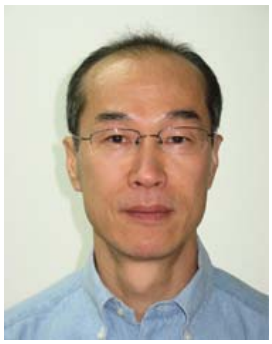
Dr. Young Joo Lee is currently the Executive Director of the Petroleum and Marine Research Division of KIGAM. He graduated Yonsei University, majoring Geology. He got Master from Yonsei University majoring in Sedimentology and got his PhD from Chung Nam National University majoring in organic geochemistry. He was the leading project manager of Korea IODP (Integrated Ocean Drilling Project) during 2003-2008. He served as an Executive Director of International Cooperation office of KIGAM from 2008 to 2012. He is now Chairperson of the Korean Society of Petroleum Geology (KSPG). And he is also board members of the Korea Society of Economic and Environmental Geology (KSEEG), Korea Society of Ocenography (KSO). His research interests are application of organic geochemistry to petroleum exploration, characterization of gas hydrates, geochemical evaluation of shale gas, and researches on drilling cores (IODP related topics).

About the instructor – *Dr. Youngseuk Keehm*

Youngseuk Keehm received his B.S. degree in geology (1991) and M.S. degree in geophysics (1993) from Seoul National University. He received his Ph.D. degree in geophysics (2003) from Stanford University. From 1993 to 1997, he was a full-time lecturer at Korea Military Academy. He was a research associate at SRB (Stanford Rock Physics and Borehole Project), Stanford University from 2003 to 2005. He joined Kongju National University in 2005 as a faculty member and leads KRP (Kongju Rock Physics Lab) with eight graduate students. His expertise is on computational rock physics methods including analysis of pore-scale topology and numerical simulations of

physical properties of rocks. His research interests include interrelation of physical properties of reservoir rocks, reservoir characterization for clastic and carbonate reservoirs, and geological storage of CO2. He received a best student paper presentation award from SEG (Society of Exploration Geophysicists) in 2001.

About the instructor – *Dr. Gwang Hoon Lee*



Dr. Gwang H. Lee is a professor in the Department of Energy Resources Engineering at Pukyong National University, Busan, Korea. He received his B.S. and M.S. degrees in Oceanography from Seoul National University in 1981 and 1983, respectively, and completed his Ph.D. in Geological/Geophysical Oceanography at Texas A&M University in 1990. He has more than 25 years of experience in seismic exploration including a stint at Shell Offshore Inc. and has performed consulting for several companies including KOGAS, DSME E&R, UES, and Fusion Geophysical (US). He was an Associate Editor for the AAPG Bulletin from 2005 to 2010. His areas of research interest are application of seismic reflection to oil/gas/gas-hydrate exploration and geological CO_2 sequestration, basin analysis, and tectonic evolution of marginal basins. He has published about 50 papers in international journals.

About the instructor – *Dr. Bohyun Chon*

Dr. Bohyun Chon is a professor in the Department of Energy Resources Engineering and Director of the Energy Resources Fusion Technology Center at Inha University. He teaches courses on petroleum engineering, including well logging and reservoir engineering. Prior to accepting the professorship at Inha University in 1991, he worked as a Chief Petroleum Engineer at Korea National Oil Corporation. Dr. Chon received his B.S. in Mineral and Petroleum Engineering from Seoul National University and M.S. and Ph. D. in Petroleum Engineering from Texas A&M University.

About the instructor – *Mr. Minki Kim*

Mr. Minki Kim is a Senior Geoscientist in the Schlumberger. His assignment history and experiences include the Senior Geoscientist & Technical Sales for G&G Domain, SIS (*Seoul, South Korea*), Operations PTEs, Engineers & Specialists, G&G Domain Technical Workflow Consultant. Also, he was a G&G Domain Technical Workflow Consultant, G&G Domain Technical Sales in Korea, Petrel Training Instructor, SIS (Tokyo, Japan) and Operations PTEs, Engineers & Specialists.

About the instructor – *Dr. S.M. Farouq Ali*

S.M. Farouq Ali is Honorary Professor of oil and gas engineering at the U. of Calgary, and he also serves as a petroleum consultant. He served as a professor at the Pennsylvania State U. and in Alberta for over 38 years. He has authored more than 500 papers, supervised more than 200 graduate theses, and carried out more than 200 reservoir studies. Recipient of numerous awards, including two honorary doctorates from universities in Russia, he received the Petroleum Society's Distinguished Service Award in 2000, APEGGA's Summit Award in 2001, and Society of Petroleum Engineers' Improved Oil Recovery Pioneer Award in 2002. Dr. Farouq Ali holds a B.Eng., B.Sc. (Hons.) in petroleum production engineering, and MS and PhD degrees in petroleum and natural gas engineering. As a professor for 40 years at Penn State University and the University of Alberta, and currently at the University of Calgary and the University of Regina, Dr. Farouq Ali has supervised over 200 graduate theses and taught more than 5,000 engineers across the world at intensive one-week courses for the petroleum industry. A specialist in reservoir engineering, oil recovery and simulation, Dr. Farouq Ali has authored over 500 papers and conducted more than 200 petroleum reservoir studies. He has designed more than 30 major oil fields projects and advised oil companies and various governments on oil policy and production strategies. He is considered one of the industry's leading experts in heavy oil. Dr. Farouq Ali has been honoured for his work with awards from the Society for Petroleum Engineers, the Canadian Institute of Mining and Metallurgy, APEGGA, and the Russian Academy of Sciences. He was awarded honorary doctorates by two major universities in Russia.

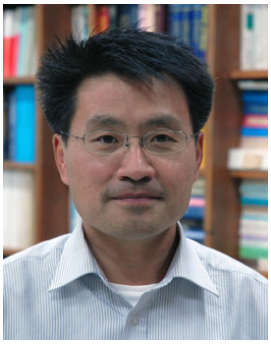
About the instructor – *Dr. Dae Sung Lee*

Dae Sung received his M.S (2001) and Ph.D. (2006) degrees in Enery & GeoEnvironmental Engineering from Pennsylvania State University in USA. From 2006 to 2007 he worked at Energy Enstitute, Pennsylvania State University. After moving to the KOREA in 2007, Dae Sung became a senior researcher to Korea Institute of Geoscience and Mineral Resources (KIGAM). Since 2011 he has been on the faculty of Dong-A University, where currently he is assistant professor of Department of Energy and Mineral Resources Engineering. His research interests are geomechanics related drilling & hydraulic fracturing and evaluation of fluid transport properties in porous media with application to permeability changes on fracture treatments in fractured reservoirs and CO2 geological sequestration.

About the instructor – *Dr. Won Suk Lee*

Dr. Won Suk Lee, a Senior Research Engineer in the Petroleum & Marine Research Division, KIGAM, Korea. Lee received M.S. (1998) and Ph.D. (2000) degrees in petroleum engineering from Hanyang university in Korea. From 2000 he worked at KIGAM (Korea Institute of Geoscience and Mineral Resources). His research has focused on reservoir simulation, reservoir characterization, reserve estimation and development of unconventional resources. Now he is a project manager of "Development of Coalbed Methane Production and Evaluation Technologies in Indonesia" in KIGAM.

About the instructor – *Dr. Ki-Bok Min*



Prof. Ki-Bok Min is currently an assistant professor at the department of energy resources engineering in Seoul National University. Throughout his career in industry, consultancy and academia, Prof. Min has been working on rock mechanics/geomehcanics applied to petroleum, mining, civil and geoenvironmental problems with special focus on coupled hydromechanical process in fractured/porous rock. His current research interest is application of coupled hydromechanics/thermohydromechanics to Enhanced Geothermal Systems (EGS), underground storage of CO_2, hydraulic fracturing for shale gas production and geological repository of nuclear waste. He is a recipient of American Rock Mechanics Association (ARMA) applied rock mechanics research award (2009) and case history award (2010). He is an editorial board member for the International Journal of Rock Mechanics and Mining Sciences.

About the instructor – *Dr. Hyundon Shin*

Dr. Hyundon Shin is an Assistant Professor at Inha University, Korea. Before joining the current position, he worked for ConocoPhillips, Suncor Energy, Husky Energy, and Shell. He completed his Ph.D. degree in petroleum engineering at the University of Alberta, Canada. He received his B.Sc. and M.Sc. from Seoul National University, Korea. He has more than ten years research and working experience for international oil and gas industry. His research interests are in-situ recovery processes and reservoir characteristics for heavy oil and oil sands development.