

Ali M Al-Mashat Ph.D Petroleum Engineering
Professor of Petroleum Engineering

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Education:

Ph.D. Petroleum Engineering: Colorado School of Mines, Golden, Colo., USA, Dec. 1976. (Minor in Mathematics)

M.S. Mechanical Engineering: University of California-Berkeley, Berkeley California, USA, Dec. 1973

B.S. Petroleum Engineering: University of Baghdad, Baghdad, IRAQ, June 1970

Scientific Position Held:

1. Research assistant in the field of Petroleum Engineering, Iraqi Scientific Research Council, Department of Petroleum and Chemical Engineering, Baghdad, Iraq (1971-1972).
2. Lecturer of Petroleum Engineering, University of Baghdad, Engineering College, Department of Petroleum Engineering (1977-1986).
3. Assistant Professor of Petroleum Engineering, University of Baghdad, Engineering College, Department of Petroleum Engineering (1986-1995).
4. Professor of Petroleum Engineering, University of Baghdad, Engineering College, Department of Petroleum Engineering (1995- 1999).
5. Professor of Petroleum Engineering, Hadhramout university of science and technology, Engineering College, Department of Chemical and petroleum Engineering (1999 – 2000)

6. Professor of Petroleum Engineering, University of Qatar, Engineering College, Department of Chemical Engineering (2000-2004).
7. Professor of Petroleum Engineering, University of Baghdad, Engineering College, Department of Petroleum Engineering (2005-2009).
8. Professor of Petroleum Engineering, University of Basra for Oil and Gas, Basra, Iraq (2014 - Until now).

Administrative Position Held:

1. Acting Chairman of Petroleum Engineering Department, College of Engineering, University of Baghdad, (1983).
2. Acting Chairman of Petroleum Engineering Department, College of Engineering, University of Baghdad, (1990).
3. Chairman and Member of Various Scientific Committees in the Department of Petroleum Engineering, College of Engineering University of Baghdad, (1977-1998).
4. Chairman of Petroleum Engineering Department, College of Engineering, University of Baghdad, Baghdad, Iraq (1992-1998).
5. Chairman of Scientific Committees in the Department of Petroleum and Chemical Engineering, University of Hadhramout , Hadhramout, Yemen (1999 - 2000).
6. Member of various Scientific Committees in the Department of Chemical Engineering, University of Qatar, Doha, Qatar (2000-2004).
7. Chairman and Member of Various Scientific Committees in the Department of Petroleum Engineering, College of Engineering, University of Baghdad, Baghdad, Iraq (2005-2007)
8. Director general of Scholarship and Cultural Relation, Ministry of Higher Education and Scientific Research, Baghdad, Republic of Iraq (Jan 2008- April 2009)
9. Senior oil & gas advisor with the Prime Ministry Advisory Commission (PMAC) / Prime Minister's Office of Iraq (April April 2009 – September 2012).
10. Scientific & Energy Advisor, Ministry of Higher Education & Scientific Research, Baghdad, Iraq (September 2012 - February 2014).

**11. President of the University of Basra for oil & Gas, Basra, Iraq
(March 2014 - Until now).**

Research Interest:

1. Thermodynamics Properties of Reservoir Fluids
2. Multiphase Flow of Fluid through Pipes.
3. Multiphase Flow of Fluid through Porous Media.
4. Oil and Gas Well Testing Analysis.
5. Rheology of Non-Newtonian Fluids.

Courses Taught:

Undergraduate Courses:

1. Fluid Mechanics.
2. Thermodynamic.
3. Mass Transfer.
4. Oil and Gas Well Drilling Engineering I.
5. Oil and Gas Well Drilling Engineering II.
6. Secondary Oil Recovery.
7. Applications to Computer Programming.
8. Oil and Gas Production Engineering I.
9. Oil and Gas Production Engineering II.
10. Natural Gas Production and Measurement.
11. Petroleum Products and Gas Properties.
12. Petroleum Reservoir Engineering I.
13. Petroleum Reservoir Engineering II.
14. Gas Reservoir Engineering.
15. Gas Technology.
16. Petroleum Refinery.
17. Unit Operations I, II, & III.
18. Industrial Process Chemistry.
19. Petrochemical Technology.
20. Introduction to Gas Engineering.
21. Process Control.
22. Supervising Various Labs in the field of Petroleum Engineering.
23. Supervising various training programs in the field of Petroleum Engineering.

24. Supervising various senior year student projects.

Graduate Courses:

1. Advanced Oil and Gas Well Drilling Engineering (M.Sc.).
2. Advanced Oil and Gas Well Drilling Engineering (Ph.D.).
3. Advanced Oil and Gas Production Engineering (M.Sc.).
4. Gas Technology (M.Sc.).
5. Multiphase Flow through Pipes (Ph.D.).
6. Advanced Well Testing (M.Sc.).
7. Advanced Well Testing (Ph.D.).
8. Advanced Reservoir Engineering (M.Sc.).
9. Advanced Reservoir Engineering (Ph.D.).

M.Sc. Theses Supervised:

1. Prediction of Abnormal Formation Pressure in Misan Field (Feb. 1987).
2. An Experimental Study of Pressure Drop for Two-Phase Flow of Drilling Mud and Gas Through Surface Chokes (Feb. 1987).
3. Study of Removing Gas Kick from Abnormally Pressured Wells (Theoretical Study), (Sep. 1987).
4. Optimum Well Location for Future Oil Reservoir Performance (Oct. 1988).
5. Experimental Study of the Subcritical Two-Phase Flow of Gas /Non-Newtonian Liquid through Chokes (Oct. 1989).
6. A Study of Two-Phase Flow (Non-Newtonian Liquid and Gas) Through Vertical Pipes (Oct. 1989).
7. A Study of Two-Phase Flow (Non-Newtonian Liquid and Gas) Through Horizontal Pipes (April, 1992).
8. A Study of Two-Phase Flow (Non-Newtonian Liquid and Gas) Through Inclined Pipes (Dec. 1993).
9. Mechanistic Model to Calculate the Total Energy Losses for Two-Phase Flow through Vertical Pipes (Dec. 1994).
10. Combined Mechanistic Model for Two-Phase Flow through Vertical Pipes (Dec. 1994).
11. Effect of Compositional Changes on Multiphase Fluid Flow through Vertical Pipes (Sep. 1995).

12. Investigation of Carbon Steel Corrosion under Two-Phase (Kerosene-Brine) and Multiphase Flow (Kerosene-Brine-CO₂) in Horizontal Pipe (Jan. 1996).
13. Stimulation of Yamana Pay Zones (Feb. 1997).
14. Mathematical Well Testing Model in Multilayer Reservoirs (May 1999).
15. Determination of Retrograde Condensation Region of Reservoir Fluids by MNM EOS (March. 2003)
16. Mathematical Model to Test and Evaluate Horizontal Wells (August 2007).
17. Gas Lift Operation in a Selected Iraqi Oil Field (Buzurgan) (May 2010)

Ph.D. Theses Supervised:

1. Evaluation of the Employment of Foams as an Enhanced Oil Recovery Agent (Dec. 1995).
2. A Comprehensive Mechanistic Model for Vertical and Inclined Two-Phase Flow (Sep. 1997).
3. Mathematical Two-Phase Flow Models for Pressure Transient Test Analysis (Oct. 1997).
4. Study of Stimulation Performance of Limestone Reservoir Rocks (Jan. 1998).
5. The Use of KCl/ Polymer Drilling Fluid to Prevent the Swelling and Sloughing of TAQ Shale and Achieve Well Bore Stability (Feb. 1998).
6. Investigating Conditions and Factors Affecting Oil/Water Separation Processes. (March. 1998).
7. Water corrosion Aspects in Selected Northern Iraqi Oil Fields (March 1998).
8. Production Future Performance of Multi-phase Flow in Porous Media under Combined Drive Mechanism (June 2009).

Published Papers:

1. Pressure Drop and Fluid Rheology of Foam under High Pressure Condition. Proceeding IRAQI Conference on Engineering ICE 85 16-19 Dec. 1985.

2. A Simplified Technique to Determine the Emulsion Cement Slurry Densities. J. of the IRAQI Soc. of Eng., June 1986.
3. Effect of Temperature and Pressure on Rheological Properties of Some Drilling Fluids. Proceedings of the Fourth Scientific Research Council, Vol. 2, Part 1, Baghdad 23-28 Oct. 1986.
4. Gas-Brine Contact Detection by Sonic Wave Velocities. J. of Petroleum Research, Vol. 7, No. 1, June 1988.
5. Frictional Pressure Losses of Foam Cement in Pipes. Proceedings of the Fourth Scientific Conference, Scientific Research Council, Vol. 2, Part 1, Baghdad 23-28 Oct. 1986.
6. An Experimental Study of Pressure Drop for Two-Phase Slug Flow of Drilling Mud and Gas through Surface Chokes. J. of the IRAQI Soc. of Eng. June 1987.
7. Proposed Method for Determining Optimal Location of Wells in Oil Producing Fields. Proceedings of the Fifth Scientific Conference, Scientific Research Council, Vol. 2, Part 1, Baghdad, 7-11 Oct. 1989.
8. Prediction and Detection of Abnormal Pressure Using the Normal Compacting Lines, Confidential Paper, Unauthorized to be Published 1989.
9. Prediction of Abnormal Formation Pressure in Misan Field, Confidential Paper, Unauthorized to be Published 1989.
10. A New Correlation for Subcritical Two-Phase Flow of Gas/Non Newtonian Liquid Mixture through Chokes. Proceedings of the International Conference on Basic Principles and Industrial Application of Multiphase Flow, London, 24-25 April 1990.
11. Proposed Model to Match the Experimental Results for Oil Displaced by Externally Generated Foam. Accepted for Publication in Polymer Plastic Technology and Engineering Jour. 1995.
12. Effect of Temperature Profile Prediction on the Performance of Multiphase Flow Correlations. Accepted for Publication in Polymer Plastics Technology and Engineering Jour. 1995.
13. Stimulation of Yamama Pay Zone. Proceeding of the Fourth Scientific Engineering Conference, College of Engineering, University of Baghdad. Baghdad, 18-20 Nov. 1997.
14. A mechanistic model for vertical and inclined two-phase slug flow. Journal of Petroleum science and Engineering, Volume 27, No 1-2, (2000) 59-67, Elsevier publication.

15. Investigation of carbon steel corrosion under two phase and multi-phase flow in horizontal pipes. Submitted for publishing in December 2005.
16. Gas lift optimization using new developed mechanistic two-phase fluid flow model. Submitted for publishing in March 2006.

Published Books:

1. Oil and Gas Well Drilling Engineering, Part I (for 3rd Year Petroleum Engineering Students).
2. Oil and Gas Well Drilling Engineering, Part II (for 4th Year Petroleum Engineering Students).

Technical Consulting Activities:

The practical fields experience obtained during my academic career was obtained through the following Engineering consulting activities:

1. Designing and performing gas lift operations in east Baghdad oil fields, Iraq.
2. Designing and performing gas miscibility operation for secondary oil recovery processes in one of the northern Iraqi oil fields, Iraq.
3. Design and optimization oil well location for future reservoir performance in some Iraqi oil fields, Iraq.
4. Design stimulation operation of Yamama pay zone in Nuhran Omer oil field, Iraq.
5. Study of stimulation performance of lime stone reservoir in one of the northern Iraqi oil fields, Iraq.
6. Improving drilling fluids properties to prevent swelling and sloughing of shale formations during drilling operation in northern Iraqi oil fields to achieve effective well bore stability, Iraq.
7. Improving operation conditions of oil/water separation processes in one of the Iraqi oil fields, Iraq.
8. Studying the water corrosion aspects in northern Iraqi oil fields, Iraq.
9. Steady and developing the processing of crude oil in Iraqi oil fields, Iraq.
10. Stead and developing the transportation and storing of crude oil in some of Iraqi oil field, Iraq.

- 11.Steady and developing the processes of dehydration, desalting, sweetening and stabilization of Iraqi crude oil, Iraq.
- 12.Steady the corrosion control of pipeline and other systems in some Iraqi oil fields, Iraq.
- 13.Steady the processing of natural and associated gases in northern Iraqi oil fields, Iraq.
- 14.Steady the processing of gas sweetening, gas dehydration in northern Iraqi fields, Iraq.
- 15.Steady the transportation of natural and associated gases in Iraqi fields, Iraq.

Training Activities:

1. Planning and supervising training programs of the petroleum engineering students in the Iraqi oil fields.
2. Planning and supervising training programs of petroleum and chemical engineering students in several Iraqi petroleum refineries
3. Planning and supervising training programs of chemical engineering students in gas treating and processing units in some Iraqi gas processing plants.
4. Planning and supervising various fields operations training programs, for Chemical and petroleum engineers (oil & gas wells, gas liquid separation, oil & gas dehydration....).
5. Coaching, monitoring & supervising process chemical engineering students and junior engineers in various industrial plants.
6. Designing and preparing catalogues and handout for on jobs trainees.

Continuing Education/Short Courses Activities:

1. Technology of drilling fluids for oil and gas wells, University of Baghdad, Baghdad, Iraq, April, 1985.
2. Fluid mechanics for petroleum and chemical Engineers, University of Baghdad, Baghdad, Iraq, March, 1986.
3. Two –Phase fluid flow through vertical and inclined pipes (part one), North oil company, kirkuk, Iraq, September, 1987.
4. Two –Phase fluid flow through vertical and inclined pipes (part two), North Oil Company, Kirkuk, Iraq, October, 1987.
5. Two –Phase fluid flow through horizontal pipes, North oil company, Kirkuk, Iraq, Feb., 1988.

6. Well Testing Analysis, University of Baghdad, Baghdad, Iraq, Jan, 1989.
7. Gas well testing analysis, University of Baghdad, Baghdad, Iraq, Jan, 1991.
8. Gas production operations, Research and Development, Ministry of oil, Baghdad, Iraq, Jun, 1992.
9. Basic surface production operations of oil and gas, Central oil company, Baghdad, Iraq, Feb, 1993.
10. Thermodynamic properties of reservoir fluids, University of Baghdad, Baghdad, Iraq, July, 1993.
11. Basic principles of Natural Gas Engineering, North oil company, Kirkuk, Iraq, July, 1994.
12. Gas treatment with chemical solvents, North oil company, Kirkuk, Iraq, Aug, 1995
13. Technology of artificial lift operations, Central oil company, Baghdad, Iraq, July, 1996
14. Sweetening, Dehydration, and Desalting of the crude oil, Research and Development, Ministry of oil, Baghdad, Iraq, Aug, 1997.
15. Natural gas transportation, Research and Development, Ministry of oil, Baghdad, Iraq, July, 1998.
16. Crude oil storing and transportation, Research and Development, Ministry of oil, Baghdad, Iraq, Dec, 1998.
17. Multiphase fluid flow through horizontal pipes, University of Qatar, Doha, Qatar, October., 2001.
18. Multiphase fluid flow through vertical pipes, University of Qatar, Doha, Qatar, November, 2002.
19. Thermodynamic properties of the gas reservoir fluids, University of Qatar, Doha, Qatar, Feb, 2003

Other Activities:

1. Member and Chairman of Various Theses Discussion Committees in Petroleum and Chemical Engineering Departments.
2. Attending Various Domestic and International Conferences.

Professional Memberships:

1. Iraqi Engineering Society, Baghdad, Iraq
2. Society Of Petroleum Engineering (SPE), USA

Current Teaching Interests

Dr. Ali Al-Mashat

I have taught over the course of my academic career virtually the entire undergraduate Petroleum engineering curriculum. This has come largely as a result of my policy wherever I have served as Department Chairman to select the courses that remain after the rest of the faculty has chosen before me. I really am comfortable with most all of the courses in the curriculum. I will discuss some courses that are my personal favorites and outline some of the distinctive aspects of my instruction.

1. **Drilling Engineering** – I have taught a two course sequence. Which include basic drilling techniques and drilling fluid properties. Topics include rock characteristics, drilling fluids, drilling mud properties, mud weight calculations, components of rotary drilling rig, drilling hydraulics, drilling bits, factors affecting rate of penetration, oil well cement and cementing operations, casing design and landing, directional and horizontal drilling, drilling problems and fishing operations, well control problems and solutions. .
2. **Production Engineering I** – in this course I deals with design of separation and treatment facilities for crude oil. Phase behavior of water hydrocarbon systems, flash calculations, 2 and 3-phase oil and gas separators sizing and design, oil-water emulsions and heater-treater design, treatment of oil field water, and oil skimmers selection and design.
3. **Production Engineering II** – In this course I go through the basic calculations for analysis and design of pumped and naturally flowing production wells. I also deal with topics include decline curve analysis, Two-phase fluid flow through vertical pipes, Inflow Performance Relationships (IPR), vertical lifts, choke performance, gas lift, and submersible pumps. Well completions, perforations, Chemical and mechanical Properties of reservoir rocks/fluids and treatment fluids, formation damage sources, detection, and modeling. Hydraulic fracturing and fracturing fluids. Acid rock interaction, acid treatment of oil reservoir. Sand Control methods.
4. **Well testing** – I covers in this course the estimation of field properties by pressure test analysis. Topics include fluid flow equations in porous media under transient conditions, pressure buildup and drawdown tests, average reservoir pressure, type curve matching, well testing of heterogeneous reservoirs, gas well testing, and test design and instrumentation.
5. **Laboratories** – my teaching philosophy in the lab is to give the student greater opportunities for self direction and team work as they proceed through the lab sequence. In some cases, I have had students propose and design their own experiments. I believe that the student learns far more trying to figure out what went wrong than if every thing proceeds smoothly.

Hopefully, this gives you a flavor for my teaching preferences and methods. As far as grading is concerned, I have never graded on a curve. I always have graded on student competencies in the course educational objectives. I have never given the same exam question twice in any course that I have taught. All of my exams are closed book, and some times open book and open notes, so that the focus may be on problems that demand analysis, synthesis, creativity and design.

Some of my previous Responsibility

*Since April 2009 until September 2012, Dr. Ali Al-Mashat work as a senior oil & gas advisor with the Prime Ministry Advisory Commission (PMAC) of Iraq. He was the leader of the project management team (PMT) and a member of the program steering committee (PSC) entrusted with the task to prepare the **Integrated National Energy Strategy (INES)** for Iraq. The following is a brief profile of the INES project and his role and contribution in its development.*

Context

The PMAC with the sponsorship of the World Bank contracted global management consulting firm Booz & Company for an 18 month engagement to develop the Integrated National Energy Strategy (INES) of Iraq.

INES Strategic Objective

The INES aims to address near term priorities, and harness the long term potential of Iraq's energy resources, covering oil & gas, power, and energy intensive industries while considering the environmental and socio-economic imperatives of the country. Five strategic objectives were identified for the INES:

- *Energy security* : Meet domestic energy demand reliably in terms of products, volumes, quality and price
- *Government value maximization* : Maximize revenues for the government with respect to associated investments in the energy sector
- *Economic diversification* : Develop industries and services to diversify the economy and increase share of non-oil GDP which includes non-oil energy, government and other sectors
- *Employment generation* : Maximize employment opportunities and household income
- *Environmental sustainability* : Minimize adverse impact of the energy sector on the environment

INES Development

The Integrated National Energy Strategy of Iraq was developed over five phases:

- *Planning Phase*: Developed a detailed work plan, data collection plan, and project governance plan
- *Baselining Phase*: Conducted a situation analysis of Iraq's oil & gas, power, and linked industry subsectors, environmental and socio-economic conditions, global trends and practices, and developed

understanding of the energy sector strengths, weaknesses, opportunities and threats

- *Formulating Phase*: Defined the vision of Iraq's energy sector, formulated and evaluated strategic options, and select the preferred strategy
- *Detailing Phase*: Detailed the selected strategy - defined the institutional enablers and developed the implementation road map and governance set-up to monitor and drive INES
- *Finalizing Phase*: Conducted several workshops with stakeholders and integrated and finalized INES

Personal Role and Contributions

Role: Leader of the PMT and Member of PSC

A dedicated Project Steering Committee (PSC) was tasked with preparing the INES. A dedicated Project Management Team (PMT) with representation from all relevant ministries in Iraq was also constituted to for the the day to day interaction with the consultants to develop the INES.

Responsibilities and Contributions:

- Ensured the quality of the deliverables - engaged the relevant experts and stakeholders to ensure that the quality of analysis and recommendations were satisfactory
- Ensured timely delivery of the project - monitored progress and ensured the project timelines are met; proactively identified risks and facilitated mitigation measures
- Provided the liaison between Booz & Company and energy sector stakeholders in Iraq including the Ministries of Oil, Electricity, Industry & Minerals, Environment, Planning, Finance, Water Resources

References:

1. Professor Dr. Mahmood Moshfeghian
Consultant/Instructor/Senior Research Engineer
John M. Campbell & Company
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3. Professor Dr. Andrew J. Wilson, P.E.
Senior Consultant
URS Qatar, LLc
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