

Applied Reservoir Engineering Course

This book aims to develop the ideas from fundamentals of percolation theory to practical reservoir engineering applications. Through a focus on field scale applications of percolation concepts to reservoir engineering problems, it offers an approximation method to determine many important reservoir parameters, such as effective permeability and reservoir connectivity and the physical analysis of some reservoir engineering properties. Starting with the concept of percolation theory, it then develops into methods to simple geological systems like sand-bodies and fractures. The accuracy and efficiency of the percolation concept for these is explained and further extended to more complex realistic models. Percolation Theory in Reservoir Engineering primarily focuses on larger reservoir scale flow and demonstrates methods that can be used to estimate large scale properties and their uncertainty, crucial for major development and investment decisions in hydrocarbon recovery.

Elements of Petroleum Geology, Fourth Edition is a useful primer for geophysicists, geologists and petroleum engineers in the oil industry who wish to expand their knowledge beyond their specialized area. It is also an excellent introductory text for a university course in petroleum geoscience. This updated edition includes new case studies on non-conventional exploration, including tight oil and shale gas exploration, as well as coverage of the impacts on petroleum geology on the environment. Sections on shale reservoirs, flow units and containers, IOR and EOR, giant petroleum provinces, halo reservoirs, and resource estimation methods are also expanded. Written by a preeminent petroleum geologist and sedimentologist with decades of petroleum exploration in remote corners of the world Covers information pertinent to everyone working in the oil and gas industry, especially geophysicists, geologists and petroleum reservoir engineers Fully revised with updated references and expanded coverage of topics and new case studies

Petroleum Reservoir Simulation, Second Edition, introduces this novel engineering approach for petroleum reservoir modeling and operations simulations. Updated with new exercises, a new glossary and a new chapter on how to create the data to run a simulation, this comprehensive reference presents step-by-step numerical procedures in an easy to understand format. Packed with practical examples and guidelines, this updated edition continues to deliver an essential tool for all petroleum and reservoir engineers. Includes new exercises, a glossary and references Bridges research and practice with guidelines on introducing basic reservoir simulation parameters, such as history matching and decision tree content Helps readers apply knowledge with assistance on how to prepare data files to run a reservoir simulator Unconventional Gas and Tight Oil Exploitation takes an in-depth look at unconventional low-permeability resource accumulations, the required technologies for specialized development, and the assessments currently being applied. With an author team of 14 subject-matter experts with specialization in different tight oil and unconventional-gas areas, this new book is an authoritative resource for those looking to increase recoverable resources. A must read for those wanting to make a significant positive impact on global energy markets while respecting the environment. Changes to global energy markets, shifts in international oil-supply projections, advancements in horizontal drilling and multistage hydraulic-fracturing technologies-these realities coalesce to potentially extend natural gas and oil supplies by several decades by current levels of consumption. In Unconventional Gas and Tight Oil Exploitation, the authors lend their expertise to offer an in-depth look at unconventional low-permeability resource accumulations, the required technologies for specialized development, and the assessments currently being applied. While percent recoveries from unconventional gas and tight oil accumulations have been very low compared with conventional reservoirs, these unconventional resources have been enough to dramatically change the slope of production decline in the United States from negative to positive in a very short period of time. This change of slope is "magical" and reflects the creativity of the oil and gas industry. The authors of this book seek to ascertain and explore the challenges and opportunities associated with the current commercial development techniques in an effort to fully understand the reservoirs, the mode of petroleum storage and transport within the reservoirs, the design of drilling and completion programs, and the physics behind formation analyses. Through this understanding, unconventional gas and tight oil exploitation techniques can be developed further, resulting in low production costs, improved economics, increase in technically recoverable resources while respecting the environment, and significant positive impact of gas and tight oil developments globally.

Applied Reservoir Engineering

Applied Statistical Modeling and Data Analytics

An Introduction to Reservoir Simulation Using MATLAB/GNU Octave

Percolation Theory in Reservoir Engineering

Practical Enhanced Reservoir Engineering

This book describes the application of modern information technology to reservoir modeling and well management in shale. While covering Shale Analytics, it focuses on reservoir modeling and production management of shale plays, since conventional reservoir and production modeling techniques do not perform well in this environment. Topics covered include tools for analysis, predictive modeling and optimization of production from shale in the presence of massive multi-cluster, multi-stage hydraulic fractures. Given the fact that the physics of storage and fluid flow in shale are not well-understood and well-defined, Shale Analytics avoids making simplifying assumptions and concentrates on facts (Hard Data - Field Measurements) to reach conclusions. Also discussed are important insights into understanding completion practices and re-frac candidate selection and design. The flexibility and power of the technique is demonstrated in numerous real-world situations.

As nations alike struggle to diversify and secure their power portfolios, geothermal energy, the essentially limitless heat emanating from the earth itself, is being harnessed at an unprecedented rate. For the last 25 years, engineers around the world tasked with taming this raw power have used Geothermal Reservoir Engineering as both a training manual and a professional reference. This long-awaited second edition of Geothermal Reservoir Engineering is a practical guide to the issues and tasks geothermal engineers encounter in the course of their daily jobs. The book focuses particularly on the evaluation of potential sites and provides detailed guidance on the field management of the power plants built on them. With over 100 pages of new material informed by the breakthroughs of the last 25 years, Geothermal Reservoir Engineering remains the only training tool and professional reference dedicated to advising both new and experienced geothermal reservoir engineers. The only resource available to help geothermal professionals make smart choices in field site selection and reservoir management Practical focus exchews theory and basics- getting right to the heart of the important issues encountered in the field Updates include coverage of advances in EGS (enhanced geothermal systems), well stimulation, well modeling, extensive field histories and preparing data for reservoir simulation Case studies provide cautionary tales and best practices that can only be imparted by a seasoned expert This course considers slightly compressible fluid flow in porous media. The differential equation governing the flow can be derived by performing a mass balance on the fluid within a control volume.

Applied Petroleum Geomechanics provides a bridge between theory and practice as a daily use reference that contains direct industry applications. Going beyond the basic fundamentals of rock properties, this guide covers critical field and lab tests, along with interpretations from actual drilling operations and worldwide case studies, including abnormal formation pressures from many major petroleum basins. Rounding out with borehole stability solutions and the geomechanics surrounding hydraulic fracturing and unconventional reservoirs, this comprehensive resource gives petroleum engineers a much-needed guide on how to tackle today's advanced oil and gas operations. Presents methods in formation evaluation and the most recent advancements in the area, including tools, techniques and success stories Bridges the gap between theory of rock mechanics and practical oil and gas applications Helps readers understand pore pressure calculations and predictions that are critical to shale and hydraulic activity

Integrated Reservoir Asset Management

A Practical Guide for the Petroleum Geosciences

Reservoir Simulation

Principles of Applied Reservoir Simulation

Petroleum Reservoir Simulation

A comprehensive overview of the key geologic, geomechanical and engineering principles that govern the development of unconventional oil and gas reservoirs. Covering hydrocarbon-bearing formations, horizontal drilling, reservoir seismology and environmental impacts, this is an invaluable resource for geologists, geophysicists and reservoir engineers.

Basic level textbook covering concepts and practical analytical techniques of reservoir engineering.

Applied Statistical Modeling and Data Analytics: A Practical Guide for the Petroleum Geosciences provides a practical guide to many of the classical and modern statistical techniques that have become established for oil and gas professionals in recent years. It serves as a "how to" reference volume for the practicing petroleum engineer or geoscientist interested in applying statistical methods in formation evaluation, reservoir characterization, reservoir modeling and management, and uncertainty quantification. Beginning with a foundational discussion of exploratory data analysis, probability distributions and linear regression modeling, the book focuses on fundamentals and practical examples of such key topics as multivariate analysis, uncertainty quantification, data-driven modeling, and experimental design and response surface analysis. Data sets from the petroleum geosciences are extensively used to demonstrate the applicability of these techniques. The book will also be useful for professionals dealing with subsurface flow problems in hydrogeology, geologic carbon sequestration, and nuclear waste disposal. Authored by internationally renowned experts in developing and applying statistical methods for oil & gas and other subsurface problem domains Written by practitioners for practitioners Presents an easy to follow narrative which progresses from simple concepts to more challenging ones Includes online resources with software applications and practical examples for the most relevant and popular statistical methods, using data sets from the petroleum geosciences Addresses the theory and practice of statistical modeling and data analytics from the perspective of petroleum geoscience applications The Complete, Up-to-Date, Practical Guide to Modern Petroleum Reservoir Engineering This is a complete, up-to-date guide to the practice of petroleum reservoir engineering, written by one of the world 's most experienced professionals. Dr. Nnaemeka Ezekwe covers topics ranging from basic to advanced, focuses on currently acceptable practices and modern techniques, and illuminates key concepts with realistic case histories drawn from decades of working on petroleum reservoirs worldwide. Dr. Ezekwe begins by discussing the sources and applications of basic rock and fluid properties data. Next, he shows how to predict PVT properties of reservoir fluids from correlations and equations of state, and presents core concepts and techniques of reservoir engineering. Using case histories, he illustrates practical diagnostic analysis of reservoir performance, covers essentials of transient well test analysis, and presents leading secondary and enhanced oil recovery methods. Readers will find practical coverage of experience-based procedures for geologic modeling, reservoir characterization, and reservoir simulation. Dr. Ezekwe concludes by presenting a set of simple, practical principles for more effective management of petroleum reservoirs. With Petroleum Reservoir Engineering Practice readers will learn to • Use the general material balance equation for basic reservoir analysis • Perform volumetric and graphical calculations of gas or oil reserves • Analyze pressure transients tests of normal wells, hydraulically fractured wells, and naturally fractured reservoirs • Apply waterflooding, gasflooding, and other secondary recovery methods • Screen reservoirs for EOR processes, and implement pilot and field-wide EOR projects. • Use practical procedures to build and characterize geologic models, and conduct reservoir simulation • Develop reservoir management strategies based on practical principles Throughout, Dr. Ezekwe combines thorough coverage of analytical calculations and reservoir modeling as powerful tools that can be applied together on most reservoir analyses. Each topic is presented concisely and is supported with copious examples and references. The result is an ideal handbook for practicing engineers, scientists, and managers—and a complete textbook for petroleum engineering students.

Lecture Notes on Applied Reservoir Simulation

Applied Petroleum Reservoir Engineering

User Guide for the MATLAB Reservoir Simulation Toolbox (MRST)

Basic Applied Reservoir Simulation

Reservoir Geomechanics

Reservoir Simulation, written by experienced simulation users, was designed to help demystify the what's and whys of designing, editing, and analyzing reservoir simulations.

This interdisciplinary book encompasses the fields of rock mechanics, structural geology and petroleum engineering to address a wide range of geomechanical problems that arise during the exploitation of oil and gas reservoirs. It considers key practical issues such as prediction of pore pressure, estimation of hydrocarbon column heights and fault seal potential, determination of optimally stable well trajectories, casing set points and mud weights, changes in reservoir performance during depletion, and production-induced faulting and subsidence. The book establishes the basic principles involved before introducing practical measurement and experimental techniques to improve recovery and reduce exploitation costs. It illustrates their successful application through case studies taken from oil and gas fields around the world. This book is a practical reference for geoscientists and engineers in the petroleum and geothermal industries, and for research scientists interested in stress measurements and their application to problems of faulting and fluid flow in the crust.

Not a mathematical treatise nor just a compendium of case histories, this text describes and shows how to apply reservoir simulation technology and principles. For the petroleum engineering professional, here is a fully-functioning reservoir simulation. For the novice it is a valuable, hands-on introduction to the process of reservoir modeling. Without an overabundance of math and case histories, this text describes and then shows how to apply reservoir simulation technology and principles. Written by a veteran developer and user of reservoir models Combines concepts and terminology DOS-based software to clearly present a comprehensive overview of reservoir simulation principles and their applications

"This book is fast becoming the standard text in its field", wrote a reviewer in the Journal of Canadian Petroleum Technology soon after the first appearance of Duke's book. This prediction quickly came true: it has become the standard text and has been reprinted many times. The author's aim - to provide students and teachers with a coherent account of the basic physics of reservoir engineering - has been most successfully achieved. No prior knowledge of reservoir engineering is necessary. The material is dealt with in a concise, unified and applied manner, and only the simplest and most straightforward mathematical techniques are used. This low-priced paperback edition will continue to be an invaluable teaching aid for years to come.

Fundamentals of Reservoir Engineering

Petroleum Reservoir Engineering Practice

The Engineering Approach

Unconventional Gas and Tight Oil Exploitation

Geothermal Reservoir Engineering

This book provides a self-contained introduction to the simulation of flow and transport in porous media, written by a developer of numerical methods. The reader will learn how to implement reservoir simulation models and computational algorithms in a robust and efficient manner. The book contains a large number of numerical examples, all fully equipped with online code and data, allowing the reader to reproduce results, and use them as a starting point for their own work. All of the examples in the book are based on the MATLAB Reservoir Simulation Toolbox (MRST), an open-source toolbox popular popularity in both academic institutions and the petroleum industry. The book can also be seen as a user guide to the MRST software. It will prove invaluable for researchers, professionals and advanced students using reservoir simulation methods. This title is also available as Open Access on Cambridge Core.

What makes this book so different and valuable to the engineer is the accompanying software, used by reservoir engineers all over the world every day. The new software, IFLO (replacing WINB4D, in previous editions), is a simulator that the engineer can easily install in a Windows operating environment. IFLO generates simulations of how the well can be tapped and feeds this to the engineer in dynamic 3D perspective. This completely new software is much more functional, with better graphics and more scenarios from which the engineer can generate simulations. BENEFIT TO THE READER: This book and software helps the reservoir engineer do his or her job on a daily basis, better, more economically, and more efficiently. Without simulations, the reservoir engineer would not be able to do his or her job at all, and the technology available in this product is far superior to most companies internal simulation software.-

This edition expands its scope as a conveniently arranged petroleum fluids reference book for the practicing petroleum engineer and an authoritative college text.

All too often, senior reservoir managers have found that their junior staff lack an adequate understanding of reservoir management techniques and best practices needed to optimize the development of oil and gas fields. Written by an expert professional/educator, Integrated Reservoir Asset Management introduces the reader to the processes and modeling paradigms needed to develop the skills to increase reservoir output and profitability and decrease guesswork. One of the only references to recognize the technical diversity of modern reservoir management teams, Fanchi seamlessly brings together concepts and terminology, creating an interdisciplinary approach for solving everyday problems. The book starts with an overview of reservoir management, fluids, geological principles used to characterization, and two key reservoir parameters (porosity and permeability). This is followed by an uncomplicated review of multi-phase fluid flow equations, an overview of the reservoir flow modeling process and fluid displacement concepts. All exercises and case studies are based on the authors 30 years of experience and appear at the conclusion of each chapter with hints in addition of full solutions. In addition, the book will be accompanied by a website featuring supplementary case studies and modeling exercises which is supported by an author generated computer program. Straightforward methods for characterizing subsurface environments Effortlessly gain and understanding of rock-fluid interaction relationships An uncomplicated overview of both engineering and scientific processes Exercises at the end of each chapter to demonstrate correct application Modeling tools and additional exercise are included on a companion website

Introduction to Petroleum Engineering

Journal of Petroleum Technology

Data-Driven Analytics in Unconventional Resources

Elements of Petroleum Geology

Applied Mathematics in Reservoir Engineering

Covering reservoir engineering fundamentals, advanced reservoir related topics, reservoir simulation fundamentals, and problems and case studies from around the world, this guide is designed to aid students and professionals alike in their active and important work. Advanced Reservoir Engineering offers the practicing engineer and engineering student a full description, with worked examples, of all of the kinds of reservoir engineering topics that the engineer will use in day-to-day activities. In an industry where there is a comprehensive account of the physics of reservoir engineering, a thorough knowledge of which is essential in the petroleum industry for the efficient recovery of hydrocarbons. Chapter one deals exclusively with the theory and practice of transient well test analysis, and presents leading secondary and enhanced oil recovery methods. Chapter two documents water influx models and their practical applications in conducting comprehensive field studies, widely used throughout the industry. Later chapters include unconventional gas reservoirs and natural gas balance equation. * An essential tool for the petroleum and reservoir engineer, offering information not available anywhere else * Introduces the reader to cutting-edge new developments in Type-Curve Analysis, unconventional gas reservoirs, and gas hydrate reservoirs Known and respected reservoir engineers

Machine Learning Guide for Oil and Gas Using Python: A Step-by-Step Breakdown with Data, Algorithms, Codes, and Applications delivers a critical training and resource tool to help engineers understand machine learning theory and practice, specifically refer to machine learning reference moves from explaining how Python works to step-by-step examples of utilization in various oil and gas scenarios, such as well testing, shale reservoirs and production optimization. Petroleum engineers are quickly applying machine learning techniques to their work, but lack of references beyond the math or heavy theory of machine learning. Machine Learning Guide for Oil and Gas Using Python details the open-source tool Python by explaining how it works at an introductory level then bridging into how to apply the algorithm to their work. While similar resources are often too mathematical, this book balances theory with applications, including use cases that help solve different oil and gas data challenges. Helps readers understand how open-source Python can be utilized in practical oil and gas applications. Algorithms for both supervised and unsupervised learning Presents a balanced approach of both theory and practicality while progressing from introductory to advanced analytical techniques

This book is a reference book that appeared and became standard text and aims to provide student and teachers with a coherent account of the basic physics of reservoir engineering. The book has been most successfully achieved without any prior knowledge of the subject. It is written in a concise unified and applied manner, and only the simplest and most straightforward mathematical techniques are used. The book is concise that will continue to be an invaluable teaching aid for years to come. This book served as a very deep and detailed reference for studies in field of upstream in petroleum economics and management course. The book outlines the techniques required for the basic analysis of reservoirs prior to simulation. It reviews rock and fluid properties, reservoir statics, determination of original oil in place, material balances, evaluation of drive mechanisms, fluid flow in porous media, aquifer influx, well testing, fluid distribution and displacement, and decline-curve analysis.

The Properties of Petroleum Fluids

Porous Media Transport Phenomena

Appraisal, Economics and Optimization

Applied Petroleum Geomechanics

Shale Analytics

The hottest, most important topic to reservoir engineers is reservoir simulation. Reservoir simulations are literally pictures of what a reservoir of oil or gas looks, or should look, like under the surface of the earth. A multitude of tools is available to the engineer to generate these pictures, and, essentially, the more accurate the picture, the easier the engineer can get the product out of the ground, and, thus, the more profitable the well will be. Completely revised and updated throughout, this new edition of a GPP industry standard has completely new sections on coalbed methane, CO2 sequestration (important for environmental concerns), Co2 Flood, more sophisticated petrophysical models for geoscientists, examples of subsidence, additional geomechanical calculations, and much more. What makes this book so different and valuable to the engineer is the accompanying software, used by reservoir engineers all over the world every day. The new software, IFLO (replacing WINB4D, in previous editions), is a simulator that the engineer can easily install in a Windows operating environment. IFLO generates simulations of how the well can be tapped and feeds this to the engineer in dynamic 3D perspective. This completely new software is much more functional, with better graphics and more scenarios from which the engineer can generate simulations. This book and software helps the reservoir engineer do his or her job on a daily basis, better, more economically, and more efficiently. Without simulations, the reservoir engineer would not be able to do his or her job at all, and the technology available in this product is far superior to most companies' internal simulation software. It is also much less expensive (\$89.95 versus hundreds or even thousands of dollars) than off-the-shelf packages available from independent software companies servicing the oil and gas industry. It is, however, just as, or more accurate than these overpriced competitors, having been created by a high-profile industry expert and having been used by engineers in the real world with successful and profitable results. This reference is THE industry standard to successfully modelling reservoirs, obtaining maximum supply and profiting from oil and gas reservoirs Includes downloadable software of the new IFLO reservoir simulation software, that can save your company thousands of dollars This edition has been updated to included new sections on environmentally important issues such as CO2 sequestration, coalbed methane, CO2 Flood The third edition also provides more sophisticated petrophysical models, examples of subsidence and additional geomechanical calculations

The book that makes transport in porous media accessible to students and researchers alike Porous Media Transport Phenomena covers the general theories behind flow and transport in porous media—a solid permeated by a network of pores filled with fluid—which encompasses rocks, biological tissues, ceramics, and much more. Designed for use in graduate courses in various disciplines involving fluids in porous materials, and as a reference for practitioners in the field, the text includes exercises and practical applications while avoiding the complex math found in other books, allowing the reader to focus on the central elements of the topic. Covering general porous media applications, including the effects of temperature and particle migration, and placing an emphasis on energy resource development, the book provides an overview of mass, momentum, and energy conservation equations, and their applications in engineered and natural porous media for general applications. Offering a multidisciplinary approach to transport in porous media, material is presented in a uniform format with consistent SI units. An indispensable resource on an extremely wide and varied topic drawn from

numerous engineering fields, Porous Media Transport Phenomena includes a solutions manual for all exercises found in the book, additional questions for study purposes, and PowerPoint slides that follow the order of the text. Geothermal Reservoir Engineering offers a comprehensive account of geothermal reservoir engineering and a guide to the state-of-the-art technology, with emphasis on practicality. Topics covered include well completion and warm-up, flow testing, and field monitoring and management. A case study of a geothermal well in New Zealand is also presented. Comprised of 10 chapters, this book opens with an overview of geothermal reservoirs and the development of geothermal reservoir engineering as a discipline. The following chapters focus on conceptual models of geothermal fields; simple models that illustrate some of the processes taking place in geothermal reservoirs under exploitation; measurements in a well from spudding-in up to first discharge; and flow measurement. The next chapter provides a case history of one well in the Broadlands Geothermal Field in New Zealand, with particular reference to its drilling, measurement, discharge, and data analysis/interpretation. The changes that have occurred in exploited geothermal fields are also reviewed. The final chapter considers three major problems of geothermal reservoir engineering: rapid entry of external cooler water, or return of reinjected water, in fractured reservoirs; the effects of exploitation on natural discharges; and subsidence. This monograph serves as both a text for students and a manual for working professionals in the field of geothermal reservoir engineering. It will also be of interest to engineers and scientists of other disciplines.

The Definitive Guide to Petroleum Reservoir Engineering-Now Fully Updated to Reflect New Technologies and Easier Calculation Methods Craft and Hawkins' classic introduction to petroleum reservoir engineering is now fully updated for new technologies and methods, preparing students and practitioners to succeed in the modern industry. In Applied Petroleum Reservoir Engineering, Third Edition, renowned expert Ronald E. Terry and project engineer J. Brandon Rogers review the history of reservoir engineering, define key terms, carefully introduce the material balance approach, and show how to apply it with many types of reservoirs. Next, they introduce key principles of fluid flow, water influx, and advanced recovery (including hydrofracturing). Throughout, they present field examples demonstrating the use of material balance and history matching to predict reservoir performance. For the first time, this edition relies on Microsoft Excel with VBA to make calculations easier and more intuitive. This edition features Extensive updates to reflect modern practices and technologies, including gas condensate reservoirs, water flooding, and enhanced oil recovery Clearer, more complete introductions to vocabulary and concepts- including a more extensive glossary Several complete application examples, including single-phase gas, gas-condensate, undersaturated oil, and saturated oil reservoirs Calculation examples using Microsoft Excel with VBA throughout Many new example and practice problems using actual well data A revamped history-matching case study project that integrates key topics and asks readers to predict future well production

A Step-by-Step Breakdown with Data, Algorithms, Codes, and Applications

Petroleum Engineering: Principles, Calculations, and Workflows

Advanced Reservoir Engineering

Fractals in Reservoir Engineering

Reservoir Engineering Handbook

Many natural objects have been found to be fractal and fractal mathematics has been used to generate many beautiful ?nature? scenes. Fractal mathematics is used in image compression and for movies and is now becoming an engineering tool as well.

This book describes the application of fractal mathematics to one engineering specialty ? reservoir engineering. This is the process of engineering the production of oil and gas. The reservoir engineer's job is to design and predict production from underground oil and gas reservoirs. The successful application of fractal mathematics to this engineering discipline should be of interest, not only to reservoir engineers, but to other engineers with their own potential applications as well. Geologists will find surprisingly good numerical descriptions of subsurface rock distributions. Physicists will be interested in the application of renormalization and percolation theory described in the book. Geophysicists will find the description of fluid flow scaling problems faced by the reservoir engineer similar to their problems of scaling the transport of acoustic signals.

Unconventional Reservoir Rate-Transient Analysis provides petroleum engineers and geoscientists with the first comprehensive review of rate-transient analysis (RTA) methods as applied to unconventional reservoirs. Volume One—Fundamentals, Analysis Methods, and Workflow is comprised of five chapters which address key concepts and analysis methods used in RTA. This volume overviews the fundamentals of RTA, as applied to low-permeability oil and gas reservoirs exhibiting simple reservoir and fluid characteristics. Volume Two—Application to Complex Reservoirs, Exploration and Development is comprised of four chapters that demonstrate how RTA can be applied to coalbed methane reservoirs, shale gas reservoirs, and low-permeability/shale reservoirs exhibiting complex behavior such as multiphase flow. Use of RTA to assist exploration and development programs in unconventional reservoirs is also demonstrated. This book will serve as a critical guide for students, academics, and industry professionals interested in applying RTA methods to unconventional reservoirs. Gain a comprehensive review of key concepts and analysis methods used in modern rate-transient analysis (RTA) as applied to low-permeability ("tight") oil and gas reservoirs Improve your RTA methods by providing reservoir/hydraulic fracture properties and hydrocarbon-in-place estimates for unconventional gas and light oil reservoirs exhibiting complex reservoir behaviors Understand the provision of a workflow for confident application of RTA to unconventional reservoirs

Fundamentals of Applied Reservoir Engineering introduces early career reservoir engineers and those in other oil and gas disciplines to the fundamentals of reservoir engineering. Given that modern reservoir engineering is largely centered on numerical computer simulation and that reservoir engineers in the industry will likely spend much of their professional career building and running such simulators, the book aims to encourage the use of simulated models in an appropriate way and exercising good engineering judgment to start the process for any field by using all available methods, both modern simulators and simple numerical models, to gain an understanding of the basic 'dynamics' of the reservoir —namely what are the major factors that will determine its performance. With the valuable addition of questions and exercises, including online spreadsheets to utilize day-to-day application and bring together the basics of reservoir engineering, coupled with petroleum economics and appraisal and development optimization, Fundamentals of Applied Reservoir Engineering will be an invaluable reference to the industry professional who wishes to understand how reservoirs fundamentally work and to how a reservoir engineer starts the performance process. Covers reservoir appraisal, economics, development planning, and optimization to assist reservoir engineers in their decision-making. Provides appendices on enhanced oil recovery, gas well testing, basic fluid thermodynamics, and mathematical operators to enhance comprehension of the book's main topics. Offers online spreadsheets covering well test analysis, material balance, field aggregation and economic indicators to help today's engineer apply reservoir concepts to practical field data applications. Includes coverage on unconventional resources and heavy oil making it relevant for today's worldwide reservoir activity.

Presents key concepts and terminology for a multidisciplinary range of topics in petroleum engineering Places oil and gas production in the global energy context Introduces all of the key concepts that are needed to understand oil and gas production from exploration through abandonment Reviews fundamental terminology and concepts from geology, geophysics, petrophysics, drilling, production and reservoir engineering Includes many worked practical examples within each chapter and exercises at the end of each chapter highlight and reinforce material in the chapter Includes a solutions manual for academic adopters

Fundamentals of Applied Reservoir Engineering

Machine Learning Guide for Oil and Gas Using Python

Unconventional Reservoir Geomechanics

Unconventional Reservoir Rate-Transient Analysis

Assisted with Simulation Software

The job of any reservoir engineer is to maximize production from a field to obtain the best economic return. To do this, the engineer must study the behavior and characteristics of a petroleum reservoir to determine the course of future development and production that will maximize the profit. Fluid flow, rock properties, water and gas coning, and relative permeability are only a few of the concepts that a reservoir engineer must understand to do the job right, and some of the tools of the trade are water influx calculations, lab tests of reservoir fluids, and oil and gas performance calculations. Two new chapters have been added to the first edition to make this book a complete resource for students and professionals in the petroleum industry: Principles of Waterflooding, Vapor-Liquid Phase Equilibria.

A comprehensive and practical guide to methods for solving complex petroleum engineering problems Petroleum engineering is guided by overarching scientific and mathematical principles, but there is sometimes a gap between theoretical knowledge and practical application. Petroleum Engineering: Principles, Calculations, and Workflows presents methods for solving a wide range of real-world petroleum engineering problems. Each chapter deals with a specific issue, and includes formulae that help explain primary principles of the problem before providing an easy to follow, practical application. Volume highlights include: A robust, integrated approach to solving inverse problems In-depth exploration of workflows with model and parameter validation Simple approaches to solving complex mathematical problems Complex calculations that can be easily implemented with simple methods Overview of key approaches required for software and application development Formulae and model guidance for diagnosis, initial modeling of parameters, and simulation and regression Petroleum Engineering: Principles, Calculations, and Workflows is a valuable and practical resource to a wide community of geoscientists, earth scientists, exploration geologists, and engineers. This accessible guide is also well-suited for graduate and postgraduate students, consultants, software developers, and professionals as an authoritative reference for day-to-day petroleum engineering problem solving. Read an interview with the editors to find out more: <https://eos.org/editors-vox/integrated-workflow-approach-for-petroleum-engineering-problems>

Principles and Best Practices

Official Monthly Publication of the Petroleum Branch, American Institute of Mining and Metallurgical Engineers