



Advanced Hydraulic Fracturing and Stimulation Technologies Training Course

Ref: #OG9355



Course Introduction / Overview:

This course provides a comprehensive exploration of advanced hydraulic fracturing and well stimulation technologies, essential for optimizing production from conventional and unconventional reservoirs. In an era where maximizing hydrocarbon recovery is paramount, a deep understanding of stimulation design, execution, and evaluation is critical. This program, offered by BIG BEN Training Center, moves beyond fundamental concepts to cover the entire lifecycle of a stimulation treatment. We will delve into the intricate science of reservoir geomechanics, fracturing fluid chemistry, and proppant transport, drawing on principles established by leading experts like Michael J. Economides. Participants will gain insights from seminal works such as "Modern Fracturing: Enhancing Natural Gas Production," learning to apply theoretical knowledge to practical field challenges. The curriculum is designed to equip professionals with the skills to design state-of-the-art fracturing jobs, utilize advanced diagnostic tools for treatment analysis, and implement strategies for refracturing and production enhancement. This course is the definitive guide for engineers and geoscientists seeking to master the complexities of modern well stimulation and drive operational excellence in the field.

Target Audience / This training course is suitable for:

- Petroleum Engineers.
- Reservoir Engineers.
- Completion and Production Engineers.
- Geologists and Geophysicists.
- Well Stimulation Specialists.
- Field Supervisors and Operations Managers.
- Technical Managers and Team Leaders.
- Research and Development Professionals in the energy sector.

Target Sectors and Industries:

- Upstream Oil and Gas Exploration and Production Companies.
- Oilfield Service and Technology Companies.

- Energy Consulting Firms.
- Governmental Regulatory Bodies and National Oil Companies.
- Research Institutions and Academia focused on petroleum engineering.



Target Organizations Departments:

- Well Completions and Interventions.
- Reservoir Engineering and Management.
- Production Operations.
- Geoscience and Exploration.
- Drilling and Well Services.
- Asset Management Teams.
- Health, Safety, and Environment (HSE).
- Research and Technology Development.

Course Offerings:

By the end of this course, the participants will have able to:

- Analyze reservoir and geomechanical data to select candidate wells for stimulation.
- Design comprehensive hydraulic fracturing treatments, including fluid and proppant selection.
- Apply principles of fracture mechanics to predict fracture geometry and conductivity.
- Evaluate and interpret data from fracture diagnostic technologies like microseismic monitoring.
- Develop effective strategies for refracturing mature wells to enhance recovery.
- Manage operational aspects of fracturing execution to ensure safety and efficiency.
- Assess post-treatment production data to determine the success of stimulation efforts.
- Optimize stimulation designs to maximize economic returns and minimize environmental impact.

Course Methodology:

The training methodology at BIG BEN Training Center is centered on creating an immersive and practical learning experience. This course integrates expert-led instruction with interactive, hands-on activities to ensure participants can translate theoretical knowledge into real-world skills. Sessions will feature a blend of detailed presentations, in-depth analysis of industry case studies, and collaborative group workshops where participants tackle complex stimulation design problems. We emphasize a participatory approach, encouraging open discussions and knowledge sharing among attendees and the instructor. Practical exercises will involve working with actual field data to perform

pre-fracture analysis, treatment modeling, and post-fracture evaluation. This active learning environment is designed to build confidence and competence. Teamwork is a core component, with participants collaborating on projects that honor the multidisciplinary nature of well stimulation projects in the industry. Continuous feedback from the instructor ensures that all participants are mastering the concepts and are prepared to apply them effectively in their professional roles upon completion of the course.



Course Agenda (Course Units):

Unit One: Fundamentals of Well Stimulation and Reservoir Geomechanics

- Introduction to hydraulic fracturing and its role in reservoir development.
- Review of reservoir rock and fluid properties.
- Principles of in-situ stress, rock mechanics, and failure criteria.
- Geomechanical characterization for fracture design.
- Data requirements for building a robust mechanical earth model (MEM).
- Understanding fracture initiation, propagation, and containment.
- The concept of net pressure and its significance in fracture analysis.

Unit Two: Fracturing Fluids, Proppants, and Chemical Additives

- Classification of fracturing fluids: water-based, oil-based, and energized fluids.
- Rheology and properties of linear and crosslinked gel systems.
- Slickwater fracturing systems for unconventional reservoirs.
- Proppant characteristics: size, strength, conductivity, and selection criteria.
- The role of chemical additives: friction reducers, biocides, and surfactants.
- Fluid loss mechanisms and control strategies.
- Advanced fluid systems, including viscoelastic surfactant (VES) fluids.

Unit Three: Hydraulic Fracture Design and Execution

- Step-by-step process for designing a fracturing treatment.
- Using analytical and numerical models for fracture design (P3D, UFM).
- Perforation strategy and its impact on treatment effectiveness.
- Pump schedule design and optimization.
- On-site quality control for fluids and proppants.
- Surface equipment and downhole tool considerations.

- Managing screen-outs and other operational challenges during execution.

Unit Four: Advanced Stimulation Techniques and Fracture Diagnostics



- Multistage fracturing in horizontal wells including sliding sleeves.
- Acid fracturing and matrix acidizing techniques for carbonate reservoirs.
- Refracturing candidate selection and design considerations.
- Diagnostic Fracture Injection Tests (DFIT) for parameter estimation.
- Real-time fracture monitoring and data analysis.
- Microseismic mapping for imaging fracture geometry.
- Tracer technology and production logging for evaluating fracture effectiveness.

Unit Five: Post-Fracture Evaluation and Future Trends

- Analyzing pressure and production data after fracturing.
- Rate transient analysis (RTA) for stimulated wells.
- Diagnosing fracture cleanup and proppant flowback issues.
- Optimizing production from fractured wells.
- The role of data analytics and machine learning in stimulation.
- Emerging technologies in waterless and sustainable fracturing.
- Economic evaluation and optimization of stimulation treatments.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

Considering the increasing environmental scrutiny and the push for sustainable energy, how can data-driven fracturing and innovative fluid systems fundamentally reshape the future of unconventional resource development beyond just enhancing recovery?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by offering an integrated, data-centric perspective in hydraulic fracturing that transcends conventional training. While many programs focus solely on the mechanics of treatment design, this curriculum places a strong emphasis on the complete workflow, from geomechanical characterization to long-term production analysis. We move beyond textbook theories to explore the practical application of advanced diagnostic tools and data analytics, equipping participants with the skills to interpret complex datasets from microseismic, tracers, and production logs. The course uniquely bridges the gap between design and evaluation, teaching professionals not just how to pump a job, but how to learn from every treatment to continuously optimize future designs. It delves deeply into the nuances of refracturing and production enhancement, critical skills for managing mature assets. By focusing on the "why" behind the "how," the course cultivates a sophisticated, analytical mindset, preparing participants to solve complex field challenges, improve economic outcomes, and lead the adoption of next-generation stimulation technologies in a rapidly evolving industry.

