Course Title: **Drilling Optimization**

Duration	**5 Days**
Delivery Mechanism	**Classroom**
Prerequisites	**Good overall knowledge of well construction processes, drilling engineering, as well as simple time and statistical analysis techniques (e.g. mean, median, mode, probabilities, percentages).**

This course will train drilling engineers in the benchmarking, identification, application, and implementation of drilling optimization techniques. These techniques will cover both offset and historical well data, as well as real-time drilling data. The intention of this class will be to give participants in this course knowledge to apply well optimization techniques in well engineering, drilling fluid engineering and well construction engineering.

Audience

Drilling engineers with 1-3 years of operations experience.

Day 1

Introduction to Drilling Optimization

- Managing drilling risks

- Impact of wellbore stability

- Drilling Risks: controllable factors and factors which constrain

- Simple probability and data distribution analysis

- Processes and techniques

The course will begin with a review of what drilling optimization is and is not, by defining and understanding the well design process from the viewpoint of optimal, efficient operations. The course will discuss drilling risks which are manageable and highlight constraints involved in the well construction process. The day will conclude with trainees giving presentations on drilling optimization processes and techniques.

Day 2

Benchmarking with Key Performance Indicators

- Offset Well Selection: relevant data, data organization, and stick plot

- Risk analysis

- Key Performance Indicators (KPI)

- Benchmarking using KPI's

- Technical Limit Identification: techniques to quantum change limits

The second drilling optimization session will begin with a review of offset well data selection, statistically relevant data, organization, and presentation of offset wells. The day will then continue with the participants learning about the theory of risk, the elements of risk, and the risk control methodologies typically used in the industry. The attendees will be provided with an overview of risk registers, HAZOP, decision trees, effective monetary values, cost-time analysis, RACI, and uncertainty assessment. This day will conclude with the definition and identification of common industry KPI's, the use of KPI's in benchmarking wells, and techniques to positively change the identified technical limits.

Day 3

Design to Execution

- Well construction design to wellsite operations

- Performance limitations

- Non-Productive time

The third day of the course will begin with an overview of how an optimized well construction design is put into efficient operation at wellsite. Deliverables, drilling forecasts, and modelling (drilling, hydraulics, T&D) will be covered by the instructor in order to highlight the requirements for 24hrs+ operational lookaheads. The participants will then investigate the controllable and non-controllable performance limitations inherent in all well plans. The day will finish with a session about examining the major contributors to non-productive time during rig site operations.

Day 4

Measurements and Technology Enablers

- Surface and downhole measurement

- Real time management of optimal well construction performance

- Typical drilling plan

- Optimization elements

- Software tools

- Task analysis and lessons learned

- ROP monitoring and improvement techniques

This day will concentrate on the surface and downhole techniques, systems, and technologies, which can be utilized to monitor and measure drilling optimization. The instructor will provide participants with detailed explanations of the current technology enablers being used to aid the drilling optimization process, as well as review the common software packages used. The day will conclude with a class discussion on ROP monitoring, improvement, and implementation of MSE during operations.

Day 5

Drilling Optimization Workshop

- Dataset workshop

- Control and review process

- Alternate optimization well plans

Participants will use real well datasets (provided by client(s)) to review the offset well dataset(s) under the guidance of the instructor (using a control & review process). In doing this each participant will provide alternate optimized well plans.