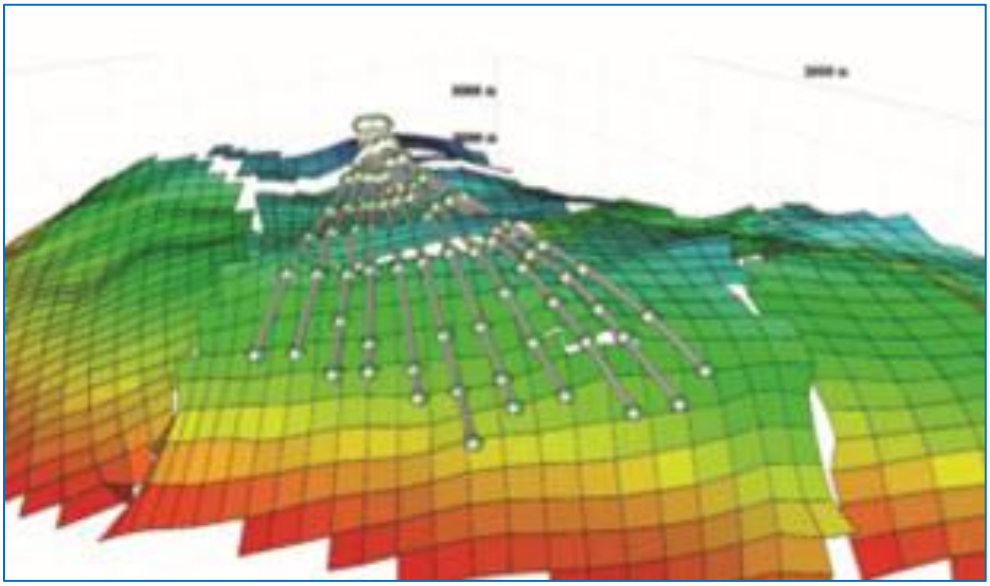
Tel No:+97126654546 | Fax No:+97126654182 | Email: aisha@cmc-me.com | www.cmc-me.com



DE310-3D:
MEPO Uncertainty and Optimization Fundamentals

Tel No:+97126654546 | Fax No:+97126654182 | Email: aisha@cmc-me.com | www.cmc-me.com

Training Description:

Sensitivity, subsurface uncertainty assessment, and history matching studies for calibrating reservoir simulation models are integral workflow tasks in many reservoir simulation studies. The training course is designed to provide the petroleum engineers with software skill and modeling techniques required to perform the tasks of managing reservoir uncertainties and optimization.

It discusses how to use MEPO uncertainty and optimization tools to perform sensitivity analysis, uncertainty assessment, and optimization (history matching) and also covers the proxy modeling concepts, benefits, limitations and its applications using the available workflow tools in MEPO.

The concepts behind the software technology and its practical applications focusing on methodology, design and execution are also covered.

The training exercises are workflow-driven intended to demonstrate the practical application scenarios and help participants understand the benefits of method applied.

Training Designed for:

This course is intended for Development and exploration petroleum engineers, reservoir engineers, geoscientists, and any asset team members who want to get acquainted to Petrel reservoir engineering workflow.

Prerequisite:
Ability to use ECLIPSE reservoir simulator.

Training Requirement:

"Hand's on practical sessions, equipment and software will be applied during the course if required and as per the client's request." (This hands-on, highly-interactive training includes simulator, real-life case studies and exercises).

This training course is available upon request in English or Arabic. Content, location and duration can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

DAY ONE:

- **Sensitivity and uncertainty assessment workflows using experimental design and sampling techniques**
  - Introduction to Sub-surface Uncertainty Quantification
  - Basic definitions for uncertainty and risk
  - Discussion on sources of uncertainty and risk in the petroleum industry
  - Explanation of dependencies and interactions between input parameters
  - Description on how to quantify and assess uncertainty using the Uncertainty and optimization tool in MEPO
  - Explanation on the typical uncertainty analysis workflow supported in MEPO

- Sensitivity analysis workflow and the steps involved in performing a sensitivity analysis
  - Design of the experiment
  - How to assess the correlation of input variables and simulation results
  - How to reduce the uncertain parameter space by considering important factors and reducing the problem complexity (uncertainty reduction)
- Discussion on the different terminologies used to express uncertainty and risk such as expected
  value, standard deviation, mean, cumulative distribution function, probability density function,
  distribution and ranges
- Explain what cumulative distribution function (CDF) is and how it is related to the probability
  density function (PDF)
- Explain the use of a CDF curve to present the probabilistic estimate of a reserves (P10, P50, and P90)
- How to set up uncertainty simulation runs in MEPO and results visualization for both sensitivity and uncertainty studies using the available visualization and results analysis tools
  - Exercises: Greenfield application scenarios

DAY TWO:

❖ **Workflow customization and History matching workflow design including an introduction to optimization techniques**

- Discussion on MEPO processes which involves; Task management, Input parameter, Response parameters and Case management.
- Python and how to customize processing tasks using Python and also writing MEPO-specific Python scripts
- Pre-processing and post-processing loop in MEPO, including selected Python scripts
- How to use MEPO to aid the history matching process following the well-structured history matching workflow steps
  - Definition of objective function that measures the history matching quality
  - Define and evaluate an uncertainty matrix
  - Set up and use an optimization algorithm for the history matching process
  - Apply a selection of analysis tools to interpret results and monitor and measure performance
- Exercises: Brownfield application scenarios

DAY THREE:

❖ **Proxy modelling techniques and its applications**

- Explanation of Proxy modeling concepts, application, benefits and limitation
- Discussion on how to identify application scenarios for proxy models
- How to define a training dataset for proxy model and creation of proxy model
- Validation of proxy model and how to create tests for evaluating proxy predictability
- Exercises: Greenfield and brownfield application scenarios

- Course Conclusion
- POST-TEST and EVALUATION

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures, Concepts, Role Play
- 30% Workshops & Work Presentations, Techniques
- 20% Based on Case Studies & Practical Exercises
- 20% Videos, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

As per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Prayer Break & Lunch)
13:30 - 15:00	Last Session

For training registrations or in-house enquiries, please contact:
Aisha Relativo - Training & Career Development Department
aisha@cmc-me.com / training@cmc-me.com
Tel.: +971 2 665 3945 / 643 6653 | Mob.: +971 52 2954615