

ESP DESIGN & PRODUCTION OPTIMISATION Course

PROVISIONAL Course Contents

Wednesday (ESP Design A)

Morning (08:30 – 12:30)

Introductions – venue / instructor / attendees / course overview

1. ESP performance fundamentals;
 - a. head generation & dependencies
 - b. impeller types and characteristics
 - c. use of pump performance curves
 - d. conversion of head to pressure with density
 - e. pressure gradient plots
 - f. practical *workshop session*; hand calculations on head/pressure conversion, fluid levels and pump performance
 - g. hand calculations using pump performance curves

Afternoon (13:30 – 17:30)

2. ESP system design & diagnosis
 - a. ESP design review and integrated system (hydraulic, mechanical, electrical) issues & solutions
 - b. practical workshop session; hand calculations of ESP design parameters (TDH, Q_{av}) and sensitivities
 - c. ESP design with software: PROSPER example
 - d. ESP system monitoring systems; surface and downhole measurements (historical and modern)
 - e. use of measured data in ESP diagnosis; electrical and hydraulic parameters; running amps & pressures
 - f. hydraulic (pressure) diagnostic principles; use for data validation and pump performance analysis
 - g. practical workshop session; practical applications of pressure diagnosis; validation of PI, PR, WC, Q etc.

Thursday (ESP Design B)

Morning (08:30 – 12:30)

3. ESP system diagnosis, troubleshooting & optimisation workshop
 - a. linking amp chart and pressure responses; main dependencies and uses; affinity laws
 - b. introduction to electrical system calculations; energy balance (hydraulic/electrical) interactions and uses
 - c. review of electrical (amp chart) interpretation techniques; limitations and practical applications
 - d. influences on ESP design (temperature, sand, scale etc.); runlife/reliability problems and solutions
 - e. production optimisation; operator expectations and drivers; production rate vs. runlife issues
 - f. whole system considerations; reservoir, well and surface facilities issues; practical solutions
 - g. practical workshop session; diagnosis and evaluation of field examples
 - h. use of electrical and hydraulic variables for ESP control and optimisation

Afternoon (13:30 – 17:30)

4. ESP operations best practices
 - i. practical workshop session; recap of fluid levels & pressures and application to ESP design/diagnosis
 - j. review of design, installation and operations best practices and procedures; use of incentive contracts
 - k. final review of practical troubleshooting and diagnostic techniques
 - l. ESP diagnosis team PROBLEMS; review and presentations
 - m. team EXERCISE (field diagnosis of an ESP problem)

5. Hydraulic Submersible Pumps (Weir/Clydepumps)
 - a. Comparison with ESP
 - b. Applications
 - c. HSP in PROSPER

END OF COURSE

Note: Each day will include practical workshop sessions illustrating the application of theory to well and ESP models. Participants are encouraged to bring field data and examples to interpret and analyse.