

Production  
Operations

# Course

# VSD Advanced Engineering



**NEXUS**  
OFS

LINKING QUALITY - CONNECTING EXCELLENCE

# OUR VALUES



## Service Excellence

We prioritize and consistently deliver top-tier service quality, exceeding industry standards to ensure the success of our clients.



## Industry Support

Committed to actively supporting and addressing the evolving needs of the Oil and Gas industry, we strive to contribute to its growth and sustainability.



## Client-Centric Growth

We embrace client feedback as a catalyst for growth, continuously evolving our business to align with the dynamic requirements of our valued clients.



## Respectful Project Prioritization

We prioritize projects with a deep commitment to honoring and respecting people. Our approach creates a friendly, collaborative environment that builds lasting trust within our team and with our clients.

# Learning Objectives

Upon completing of this course, students will be able:

- To define the operation and construction of the electrical drives based on the inverter technology
- To review VSD Parts and function
- To understand troubleshooting methods for VSD
- To analyses and familiarize on how to utilize VSD drawings and Part
- vStep up transformer function and how to select the tap changer
- Calculate motor voltage and voltage drop
- Successful perform commissioning and startup

# Day 1

- Class Introduction
- Pre-Training Test

## VSD Drive

- Reasons and advantages of variable speed drive comparisons
- Variable speed drives basic theory, voltage source inverter and convertor
- Variable speed drives disadvantages, harmonics mitigation
- Variable speed drives parameter programming

## Day 2

### Drives Fundamentals

- Basic principles of Variable-Speed Drives (VSD's
- Power semiconductors, diode, thyristor (SCR), IGBT
- Inverters, voltage-source and current-source, pulse width modulated (PWM) inverters
- Switching transients, harmonics and power factor
- AC drive line power factor, insulation voltage stress
- Simulator video for rectifier and inverter operation

## Day 3

### **Variable speed drives generic troubleshooting techniques**

- Variable speed drives modes of operations, and, common failure modes
- Variable speed drives motor bearing maintenance
- Testing and identification of failed thyristor and diode
- inspections, detecting phase unbalances, loss of phases



## Day 4

### Protection of AC motors, requirements and drives protection

- VSD motor problem areas, voltage on shaft, shaft induced current
- Variable speed drives maintenance
- Protection of inverters and electronic converters driving motors

## Day 5

### **VSD problem areas and protection**

- Methods of preventing VSD failures
- How to select the correct VSD for your applications.
- Step up transformer selection and adjusting voltage.
- Commissioning VSD and startup



# OUR SERVICES



**NEXUS PETROLEUM ACADEMY**



**NEXUS MENTORING**



**ENGINEERING SERVICES**



**TRAININGS**



**NEXUS COLLABORATION  
(TECHNICAL WORKSHOPS AND  
WEBINARS)**



**EMPLOYEE GAP ASSESSMENT**



**EMPLOYEE SCREENING ASSIST**



**FIELD DIGITALIZATION**



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