

## INDUCTION MACHINES AND VARIABLE FREQUENCY DRIVES (VFDs)

Hands-on industrial training designed for engineers and technicians working with motors and drives.



PRACTICAL KNOWLEDGE



REAL-WORLD APPLICATIONS



IMPROVED EFFICIENCY AND PERFORMANCE



**DURATION**  
8 Hours (1 day)  
Lunch Included



**DELIVERY**  
In-Person or  
Online



**CERTIFICATE**  
Certificate of  
Completion Provided



### WHO SHOULD ATTEND

- Electrical, Industrial, Manufacturing, Automation, and Power Engineers
- Engineers working in utilities and energy systems
- Engineering technologists and technicians
- Field service and maintenance engineers
- Graduate and senior undergraduate students
- Engineers pursuing Continuing Professional Development (CPD) and PEO requirements
- Instructors and professors in engineering programs



### COURSE BENEFITS

Participants will develop a strong understanding of induction machines and their real-world applications. They will learn to analyze torque-speed characteristics, power flow, efficiency, and performance using equivalent circuit models. The course introduces VFD operation and its impact on motor control and energy efficiency. Practical skills for design, operation, troubleshooting, and maintenance will be emphasized.



### INDUSTRY RELEVANCE

Induction machines are widely used in industrial applications such as pumps, fans, compressors, and manufacturing systems. With increasing adoption of VFDs, engineers must understand both machine fundamentals and modern control techniques. Applications in renewable energy and efficiency-driven industries make this topic highly relevant.



### MARKET DEMAND

Demand for this course is strong due to the widespread use of induction motors and the growing VFD market. Industry trends in automation, HVAC, and energy efficiency continue to drive the need for skilled engineers in this area.



### FUTURE LEARNING PATH

This course can lead to advanced topics such as vector control, field-oriented control (FOC), motor protection, condition monitoring, and advanced drive systems.

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### COURSE OUTLINE

- 1 Fundamentals, construction of induction motors and rotating magnetic field
- 2 Equivalent circuit and performance analysis: power flow, losses, efficiency
- 3 Torque-speed characteristics: starting torque, breakdown torque
- 4 Induction motor operation and applications
- 5 Induction generators and renewable energy applications
- 6 Introduction to VFDs: structure, V/f control, efficiency impact



### WHAT YOU WILL GAIN

A solid understanding of induction machines and VFDs, with the ability to select, operate, analyze, and troubleshoot motor drive systems to improve reliability, performance, and energy efficiency.



### ABOUT THE INSTRUCTOR



#### HUSSIN HASSEN, P.Eng

**Degree:** Master of Applied Science in Electrical Engineering from University of Waterloo

**Certificate:** Professional Engineering Certificate from PEO in Ontario

**Practical Experience:** Over 20 years of experience in testing and commissioning of UPS systems, excitation systems for hydroelectric plants and smart battery storage systems.

**Teaching Experience:** Experienced educator with more than a decade of teaching in electrical engineering, specializing in power electronics and electric machines.



### COURSE DELIVERY

This course can be delivered online or in-person at our location or at the customer's location.



### ADDITIONAL INFORMATION

- ✓ Course materials and practical examples included
- ✓ Certificate of completion provided
- ✓ Hands-on training (when delivered in-person)
- ✓ Customized delivery available for corporate clients



**VENUE & STARTING DATE**  
TBA  
Please contact us for details on upcoming sessions.



**COST**  
Please contact us for group pricing and corporate training packages.



### COURSE SCHEDULE

- Duration: 8 hours (1 day)
- Delivery: In-person / Online
- Next Session: TBA



### CERTIFICATE

Certificate of attendance will be provided upon successful completion.