

# Electrical Motor Current Signature Analysis (MCSA)



## Who Should Attend?

This course is suitable for:

- Electrical Engineers
- Maintenance Technicians
- Plant and Facility Managers
- Condition Monitoring Specialists
- Reliability Engineers
- Electrical Technologists
- Motor Manufacturers and Suppliers
- Research and Development Personnel



Dates : 8 – 12 June 2026

VENUE : Avani Windhoek Hotel & Casino

COST : R12 500.00pp

Early Bird Booking price: R11 995.00pp

## REGISTER NOW

Switchboard: +27 (68 633 8497

Email: [afriscience@afriscience.co.za](mailto:afriscience@afriscience.co.za)

Attendance by two or more representatives of your organization will foster teamwork and enhance the program's impact

## COURSE OVERVIEW

This highly practical and interactive course on Electrical Motor Current Signature Analysis (MCSA) combines theoretical knowledge with extensive hands-on application. Participants will engage in practical exercises and simulations using state-of-the-art equipment to reinforce learning outcomes.

The course provides a comprehensive and up-to-date understanding of MCSA and its critical role in predictive maintenance. It covers fundamental concepts, including the principles, benefits, and limitations of MCSA, as well as core electric motor theory, types, and operational characteristics.

Participants will explore motor faults and failure modes, analyse motor current signatures, and develop skills in interpreting diagnostic data. The programme also introduces key signal processing techniques, including preprocessing for noise reduction, time-domain analysis, and frequency-domain analysis.

In addition, the course examines feature extraction from current signals, advanced fault detection and diagnostic methods, and pattern recognition techniques for fault classification. Common motor faults and their associated signature patterns will be analysed in detail, enabling participants to accurately correlate fault types with observed electrical signatures.

The course further addresses MCSA instrumentation, including sensor selection and installation, data acquisition systems, and equipment calibration and verification.

Through interactive sessions, participants will gain practical experience in test preparation, system setup, data acquisition, and troubleshooting. Advanced analytical methods such as wavelet analysis, time-frequency analysis, harmonic analysis, sideband analysis, and demodulation techniques will also be covered. Finally, the course explores the integration of MCSA within broader condition monitoring frameworks, including its application alongside vibration analysis and temperature monitoring, supported by data fusion techniques for comprehensive motor health assessment.

## COURSE OBJECTIVES

Upon successful completion of this course, participants will be able to:

- Develop in-depth knowledge of Electrical Motor Current Signature Analysis (MCSA)
- Explain the importance and applications of MCSA in predictive maintenance
- Understand the principles, benefits, and limitations of MCSA
- Review electric motor fundamentals, including types and characteristics
- Identify motor faults, failure modes, and interpret current signatures
- Apply signal processing techniques, including noise reduction, time-domain, and frequency-domain analysis
- Extract and analyse key features from motor current signatures for fault diagnosis
- Apply pattern recognition techniques for fault classification
- Interpret MCSA results and correlate fault types with current signatures
- Select, install, and utilise MCSA equipment and sensors
- Operate data acquisition systems and perform calibration and verification
- Prepare motors and systems for MCSA testing
- Conduct testing procedures, data acquisition, analysis, and troubleshooting
- Apply advanced techniques such as wavelet, harmonic, and time-frequency analysis
- Use demodulation techniques for fault detection
- Integrate MCSA into overall condition monitoring systems
- Combine MCSA with vibration and temperature monitoring
- Apply data fusion techniques for comprehensive asset health assessment

## COURSE PROGRAMME

The following schedule outlines the planned course structure. Adjustments may be made by the instructor as required.

### Day 1: Introduction & Fundamentals

- Introduction to MCSA: Importance, applications, principles, benefits, and limitations
- Electric motor fundamentals: principles, types, and characteristics
- Motor faults, failure modes, and current signature interpretation

### Day 2: Signal Processing & Feature Analysis

- Signal processing fundamentals and noise reduction techniques
- Time-domain and frequency-domain analysis (RMS, envelope, FFT, spectral analysis)
- Feature extraction and diagnostic analysis
- Pattern recognition and case studies

### Day 3: Fault Diagnosis & Instrumentation

- Common motor faults and signature patterns (rotor, stator, bearings, etc.)
- Fault interpretation and correlation
- MCSA equipment, sensors, installation, and configuration
- Data acquisition, calibration, and verification

### Day 4: Practical Application & Advanced Techniques

- Test preparation, system setup, and data acquisition
- Data interpretation, challenges, and troubleshooting
- Advanced techniques: wavelet, time-frequency, harmonic, and sideband analysis
- Demodulation techniques for enhanced fault detection

### Day 5: Integration & Case Studies

- Integration of MCSA into condition monitoring systems
- Combining MCSA with vibration and temperature monitoring
- Data fusion for comprehensive diagnostics
- Case studies and real-world applications
- Course review, assessment, and certification

## ULTIMATE LEARNING SOLUTIONS

“We redefine education, inspiring lifelong growth through innovative learning solutions.”





**"Empowering Excellence: Afriscience Training Programs, Where Learning Extends Beyond Courses to Forge Lasting Partnerships."**



## REGISTRATION FORM

To register please complete the form so that we can process your registration,  
and email to [info@afriScience.co.za](mailto:info@afriScience.co.za) or sender | Tel: 087 7025808  
(PLEASE COMPLETE IN CAPITAL LETTERS)

Company Name:  Country:   
Postal Address:   
Postal Code:  Tel:   
Cell:  Email:   
Nature of Business:

☐ Please register the following delegate(s) for this Conference (Please photocopy for more delegates)

|                                     |                                   |                             |
|-------------------------------------|-----------------------------------|-----------------------------|
| Delegate Name: <input type="text"/> | Designation: <input type="text"/> | Email: <input type="text"/> |
| Delegate Name: <input type="text"/> | Designation: <input type="text"/> | Email: <input type="text"/> |
| Delegate Name: <input type="text"/> | Designation: <input type="text"/> | Email: <input type="text"/> |
| Delegate Name: <input type="text"/> | Designation: <input type="text"/> | Email: <input type="text"/> |
| Delegate Name: <input type="text"/> | Designation: <input type="text"/> | Email: <input type="text"/> |

### Method of payment

☐ Bank transfer ☐ Cash or Direct Deposit  
Payment and/or Banking details will be sent on receipt of a completed booking form.

All payments to reflect the invoice number

### Booking Fee:

☐ Early Bird Fee ☐ Normal Booking Fee

**Early booking fee is for a booking received 30 days before the training date.**

An invoice will be sent upon receipt of registration form. Payment must be received prior to course start and State your invoice number as reference for payment

### TERMS & CONDITIONS

I have read and understood the booking terms and conditions

Mr. ☐ Mrs. ☐ MS. ☐ Surname:

Name of Organisation:

Job title:

E-mail:

Date:

Tel: Cell:

### CANCELLATIONS & TRANSFERS

If you are unable to attend, a substitute delegate is welcomed at no extra charge. Please provide the name and the title of the substitute delegate at least 2 working days prior to the Conference. Regrettably, no refund can be made for cancellation received 2 weeks before the date of the course. A complete set of documentation will however be sent to you. The organiser reserves the right to make any amendments and/or changes to the programme, venue, speaker replacements and/or topics if warranted by circumstances beyond its control

Signature:

