

**In-Person Course
2nd Edition**

Data Science and Industrial AI for Maintenance & Reliability Optimization

Join our global industry expert & instructor:

Dr. Diego Galar, and transform your learning experience.

16 Hours | 2 Day In-Person Experience

14 -15 September 2025

Centro Corniche by Rotana
Al Khobar, Saudi Arabia



www.biiworld.com

COURSE OVERVIEW:

This 2 Day Face to Face course dives into the cutting-edge application of data science and AI to optimize Maintenance & Reliability processes. Designed for professionals in high-value asset-intensive sectors, it explores diagnostics, prognostics, predictive maintenance, and advanced analytics.

The total 16hrs sessions will have key topics which will include the integration of digital twins, hybrid models, and context-aware systems, as well as managing black swan events and leveraging prescriptive analytics for proactive decision-making. Case Studies and Real-World examples will be discussed too during this interactive and immersive training.

LEARNING OBJECTIVES:

- Recognize the importance of diagnostics and prognostics in M & R.
- Apply data science, machine learning, and AI techniques to predictive maintenance.
- Understand black swan events and strategies to mitigate them.
- Develop skills in hybrid modelling, digital twins, and context-driven diagnostics.
- Implement prescriptive analytics to enhance decision-making in M & R.

TARGET AUDIENCE:

Job Titles:

- Maintenance Managers
- Reliability Engineers
- Data Scientists
- MRO Specialists
- AI and ML Engineers
- Asset Management Professionals

Job Industries:

- Oil & Gas
- Manufacturing
- Transportation
- Energy
- and sectors focused on Asset Reliability, Maintenance & Reliability and MRO optimization.





Instructor:

Dr. Diego Galar

... your **EXPERT TRAINER**
for this Course.

Dr. Diego Galar is a Full Professor in the Division of Operation and Maintenance Engineering at Luleå University of Technology (LTU), where he significantly contributes to the fields of maintenance, reliability, and industrial technologies. Additionally, he serves as the Research & Technology Director at Sisteplant (Spain), specializing in predictive maintenance solutions and condition monitoring.

He has played a crucial role in coordinating numerous European projects, emphasizing cyber-physical systems, Industry 4.0, IoT, and Industrial AI and Big Data. His collaborative efforts with the Swedish industry and national agencies, including Vinnova, have advanced maintenance technologies and practices. These projects often involve multi-disciplinary teams and international partners, reflecting Dr. Galar's ability to lead complex research initiatives.

An extensive publication record that includes over 500 journal and conference papers, books, and technical reports, Dr. Galar's work is highly regarded in the maintenance field. His research has been widely cited, influencing the development of new methodologies and tools for predictive maintenance and condition monitoring. His scholarly contributions extend to editorial roles in leading journals and active participation in scientific committees. Dr. Galar frequently chairs international conferences, where he shares his insights as a keynote speaker.

Dr. Galar is actively involved in national and international committees for standardization and R&D in reliability and maintenance. He has been instrumental in developing standards and guidelines that have been widely adopted across various industries. His roles in these committees underscore his commitment to advancing the field through rigorous standards and best practices.

In his roles as the secretary and director of industry relations at the European Federation of National Maintenance Societies (EFNMS), Dr. Galar actively promotes maintenance practices and standards across Europe. His leadership has driven significant advancements in maintenance education and the development of new certification programs for maintenance professionals.



PRESENTATIONS: Day 1

08:00 - Delegate Registration

08:30 - Pre-Course Intro – Delegate Expectation Briefing

Foundations of MRO Optimization and Diagnostics

Session 1: Introduction to Digital M & R Optimization

- M & R fundamentals and the impact of digital transformation.
- Trends: smart assets, interconnected systems, and the convergence of OT and IT.
- Evolution of failure response paradigms: from fixed to dynamic maintenance.



Session 2: Basics of Data Science and AI for M & R.

- Types of industrial assets (physical, informational, and intangible).
- Introduction to data-driven diagnostics and prognostics in M & R.
- The role of hybrid models in asset health monitoring.



Session 3: Diagnostics and Prognostics for Dynamic Equipment

- Health fingerprinting: creating a data-based condition profile of assets.
- Multi-failure detection using ensemble models (KNN, SVR, and MLP).
- Hybrid diagnostics: combining physical insights with data-driven predictions.



Case Study – 1: AI-Driven Diagnostics in MRO

- Real-world application of synthetic signals in diagnostics.
- Techniques for failure fingerprinting and real-time alerts.





Predictive Maintenance and Managing Black Swan Events

Session 4: Predictive Maintenance with Data Science and AI

- Data science techniques for predictive maintenance in M & R.
- Integrating real-time data for proactive interventions.
- Advanced machine learning models for predicting Remaining Useful Life (RUL)

Session 5: Context-Driven Analytics and Black Swan Events

- Context-aware diagnostics: enhancing AI predictions with operational context.
- Understanding black swan events: rare, high-impact anomalies in M & R.
- Strategies to detect and respond to black swan events using hybrid models.



Session 6: Real-Time Data Integration for Predictive Insights

- Convergence of OT and IT in MRO (SCADA, PLC, CM systems).
- Real-time anomaly detection and managing predictive obstructions.
- Tools for context-aware analytics in oil and gas.



Case Study – 2: Black Swan Event Management in M & R.

- Practical applications of context-aware diagnostics to detect anomalies.
- Real-world example of predictive analytics in oil & gas M & R.

Post Session Q & A | 16:30 – End of Day 1

10:15 - 10:30 AM COFFEE BREAK | 12:30 - 13:30PM LUNCH BREAK | 15:00 - 15:15PM COFFEE BREAK



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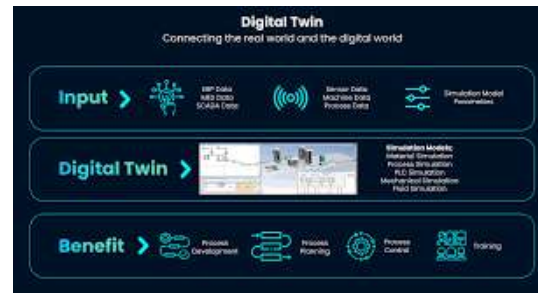
PRESENTATIONS: Day 2

08:30 – Review of Day 1

Advanced Hybrid Models, Digital Twins, and Virtual Commissioning

Session 7: Hybrid Modelling for Enhanced Predictive Maintenance

- The value of combining data-driven and physical models.
- Key components of hybrid models: data reduction, anomaly detection, and feature extraction.
- Practical examples of hybrid models in diagnosing dynamic equipment.



Session 8: Digital Twins and Virtual Commissioning in M & R

- Introduction to digital twins for asset lifecycle management.
- Virtual commissioning and simulation for proactive asset management.
- Benefits of digital twins in predictive and prescriptive maintenance.



Session 9: Practical Application of Digital Twins

- Creating and managing digital twins for critical equipment.
- Leveraging synthetic data to train predictive models.
- Integration of digital twins into daily MRO operations.

Case Study - 3: Digital Twin Application in Oil and Gas

- Implementation of digital twin models for real-time condition monitoring.
- Using digital twins to predict and prevent equipment failures.



PRESENTATIONS: Day 2 (Continuation)



Prescriptive Analytics, Cognitive Maintenance, and Future Trends

Session 10: Prescriptive Analytics for Decision Support in M & R

- Moving from predictive to prescriptive analytics: scenario simulation.
- Context-aware RUL predictions for dynamic environments.
- Prescriptive maintenance strategies for operational improvements.

Session 11: Cognitive Maintenance and Self-Preserving Assets

- Cognitive maintenance: an evolution of predictive maintenance.
- Self-preserving assets in unmanned environments and dark factories.
- Role of Industrial AI in unmanned M & R and autonomous systems.



Session 12: Practical Challenges in M & R Automation

- Overcoming challenges in integrating hybrid and cognitive models.
- Handling structured and unstructured data for predictive accuracy.
- Best practices in context-aware analytics for large-scale M & R.



Case Study - 4: The Future of Digital M & R and Industrial AI

- Digital transformation and its impact on MRO efficiency and resilience.
- Lessons from industrial applications in remote and autonomous maintenance.
- Future trends in MRO: AI-driven automation, resilience, and robustness.

Post Session Q & A | 16:30 - End of Day 2 & Course

10:15 - 10:30 AM COFFEE BREAK | 12:30 - 13:30 PM LUNCH BREAK | 15:00 - 15:15 PM COFFEE BREAK



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Please complete this form and send it back to
vijay.kumar@biiworld.com

Event Code: ME TE 03

Delegate Details

- Name: Mr/Mrs/ Ms
.....
Job Title:
Email:
- Name: Mr/Mrs/ Ms
.....
Job Title:
Email:
- Name: Mr/Mrs/ Ms
.....
Job Title:
Email:

PAYMENT METHOD:

CREDIT CARD ☐

The secured payment link will be shared/sent

WIRE TRANSFER OR BANK TRANSFER ☐

Authorization and Acceptance of Sales Contract & Terms & Conditions

I hereby declare I am authorised to sign this contract and terms
& conditions in the name of the company/organisation:

Name:

Date:

Signature:

Company/Organisation Detail

Name:
Person to Contact:
Email:
Address:
.....
City:
Country:
Contact No:
Type of Business:
Website:

Delegate Fee ☐ **USD 2099 per delegate**

20 USD administration charge and any applicable withholding or any other tax or fee will be applied

TERMS & CONDITIONS:

1. Payment terms: BII World LTD requires the full payment of the invoiced amount within 7 working days from the issue date of the invoice. BII World LTD reserves the right to refuse entry to any client who does not pay the invoice in full and on time. The registration fee includes: Training documentation and admission to all training sessions.

2. Cancellation by client: The client has the right to cancel his/her participation in the event. Cancellation must be received by BII World LTD in writing either by mail or fax. If the client cancels the event, he/she will get two options:

A. CREDIT NOTE: Choose 2-year credit note, BII World LTD will send all the schedule training event details throughout the year. Delegate has the right to choose and attend any of the future training programs of BII World (valid 2 years).

B. NOMINATION: In this option delegate can nominate/refer someone from his/her group/company to attend the particular training program on behalf of the actual delegate.

3. Cancellation by BII World LTD : While every reasonable effort is made to adhere to the advertised program, circumstances can arise which may cause changes in the program, including but not limited to changes in the content, date(s), or special features of the planned event. Such circumstances include but are not limited to acts of terrorism, war, extreme weather conditions, compliance with government requests, orders and legal requirements, failure of third-party suppliers to timely deliver, and failure to register the minimum target number of attendees for a given event. BII World LTD reserves the right to change the content, date(s), and/or special features of an event, to merge the event with another event, or to postpone it or cancel it entirely as appropriate under the circumstances. Client agrees that BII World LTD shall not be liable for any cost, damage or expense which may be incurred by client as a consequence of the event being so changed, merged, postponed or canceled and client agrees to hold BII World LTD harmless and to indemnify BII World LTD in case of liability caused by any such changes, mergers, postponements or cancellations.

4. Cancellation of the event: In case BII World LTD cancels an event, then client can choose any of the below mentioned options:

- BII World LTD will refund full payment to the client within 15 business days.
- Client can choose the credit option for 2 years, for more details please read term no-2 part (a)

5. Postponement of the event : In case BII World LTD postpones the event to a new date, then client can choose any of the below mentioned options.

- The client can attend the course on the postponed dates.
- Client can choose the credit option for 2 years, for more details please read term no-2 part (a)

6. Client's identification information. By signing of this sales contract and these terms and conditions the client gives full right to BII World LTD to share the client's identification information, i.e. client's name, address, email addresses, phone numbers and names of representatives and website with other clients who participated in the same event. The client has the right to opt out of this clause by written notice to BII World LTD.

7. Governing law: This contract shall be governed by and construed in accordance with the laws of the Province of Alberta, Canada. Any disputes arising under or in connection with this registration form shall be sealed before the competent court in Canada.

8. Indemnification: To the fullest extent permitted by the law, you agree to protect, indemnify, defend and hold harmless BII World LTD, its owners, managers, partners, subsidiaries, affiliates, officers, directors, employees and agents, from and against any and all claims, losses or damages to persons or property, governmental charges or fines, penalize, and costs (including reasonable attorney's fees) (collectively "the Claims"), in any way arising out of or relating to the event that is the subject of this contract, and regardless of negligence, included but not limited to, Claims arising out of the negligence, gross negligence or intentional misconduct of BII World LTD employees, agents, contractors, and attendees; provided, however, that nothing in this indemnification shall require you to indemnify BII World LTD Indemnified parties for that portion of any Claim arising out of the sole negligence, gross negligence or intentional misconduct of the BII World LTD parties.

9. Other currencies. In case that client requests payment in other than official currency (USD), BII World LTD reserves the right to apply 5% currency risk surcharge to the actual exchange rate.

10. Other Conditions: Any terms or conditions contained in the client's acceptance which contradict or are different from the terms and conditions of this registration document shall not become part of the contract unless individually negotiated with BII World LTD and expressly accepted by BII World LTD.