

### About The Course

The course duration is 2 days and will consist of both theoretical and practical applications of risk and reliability engineering. The course will introduce the fundamentals of Risk analysis and reliability engineering. Quantity risk analysis, basic statistics, distribution of failure, reliability of failure, consequences of failure and monte-carlo simulations (MCS).

On successful completion of this course, you will be able to: 1) identify and analyse the concepts and principals of risk and reliability engineering and their potential applications to different engineering problems. 2) Assess and analyse appropriate approaches to the collection and interpretation of data in the application of risk and reliability engineering methods. 3) Evaluate and select appropriate techniques and tools for qualitative and quantitative risk analysis and reliability assessment. 4) Analyse and evaluate failure distributions, failure likelihood and potential consequences and develop solutions for control/mitigation of risks.

Why should we do a risk and reliability analysis?

- Enable good decision making in the presence of uncertainty.
- Demonstrate that all risks are identified and appropriately mitigated or reduced (ALARP)
- Moral- risk of death or serious injury (Safety)
- Legal- comply with regulators. (UK-Health and Safety Executive)
- Economic- profit, return for investors/ Shareholders.

### Who Should Attend?

This training is suitable for mechanical, process, energy engineers and professionals that want to obtain knowledge on applied aspects of risk and reliability engineering.

### Cost

The registration fee for the course will be £3000 plus Vat (UK ONLY) for a minimum of 6 people. For additional persons, it will be £600 plus Vat per person.

### Payment

Payments can be made by cheque (made payable to ASRANet Ltd.), cash or bank transfer. Please enquire for details.

### Contact

ASRANet Limited

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## ONLINE COURSE

# Risk Analysis & Reliability Engineering

## IN-HOUSE COURSE



(A Maritime Company for Courses, Conferences and Research)

## PROGRAMME (All timings are in GMT)

### Day 1

09.00 - 10.30	<b>Lecture 1: Introduction to Risk Analysis</b> Basic concept of Safety and Risk Analysis. Definition of Reliability and Availability and Resilience. Qualitative And Quantitative Risk Assessment. <i>Dr Donya Hajjalizadeh</i>
10.30 –10.45	<i>Break</i>
10.45 – 12.15	<b>Lecture 2: Statistical analysis</b> Statistical analysis: Interpretation of statistical output and data visualization; Introduction to regression modelling techniques. <i>Dr Srinivas Sriramula</i>
12.15 – 13.15	<i>Break</i>
13.15 – 14.45	<b>Lecture 3: Quantitative Risk Assessment: FMEA,FMECA.</b> Introduction to the Failure mode, effects, and criticality analysis (FMECA) and Fault tree and event tree analysis. <i>Dr Donya Hajjalizadeh</i>
14.45 – 15.00	<i>Break</i>
15.00 – 16.30	<b>Lecture 4: Data analysis and Distribution fitting</b>

Hypothesis testing; goodness of fit distribution tests.  
*Dr Srinivas Sriramula*

### Day 2

09:00– 10.30 **Lecture 5: Basics of simulation, Monte Carlo simulation**  
Advantages and limitation of Monte Carlo methods.  
Dr Donya Hajjalizadeh

10:30-10:45 *Break*

10.45– 12.15 **Lecture 6: HAZOP and Functional Safety**  
Hazard and operability study analysis (HAZOP); elements of functional safety analysis  
*Dr Srinivas Sriramula*

12.15 – 13.15 *Break*

13.15 – 14.45 **Lecture 7: Safety integrity levels – assessment and verification**  
SIL fundamentals, target risk levels, SIL assessment, Markov processes: basic elements  
*Dr Srinivas Sriramula*

14.45 – 15.00 *Break*

15.00 – 16.30 **Lecture 8: Reliability analysis**  
Important sampling, Line Sampling and Subset Simulation.  
Dr Donya Hajjalizadeh

## ABOUT THE LECTURERS:

### Dr Srinivas Sriramula

Dr Srinivas Sriramula is currently a Senior Lecturer at the University of Aberdeen. Dr Sriramula specialises in technical safety computations and has over 15 years research experience in developing uncertainty quantification schemes for engineering systems. To date he has participated in a number of collaborative research projects on asset risk, reliability and maintenance modelling, funded by InnovateUK, International Government agencies, Industrial partners, and the Lloyd's Register Foundation (LRF).

Dr Sriramula is a Chartered Engineer (IMechE) and currently coordinates the MSc in Safety and Reliability Engineering (including for Oil&Gas), MSc Subsea Engineering and MSc Offshore Engineering at the University of Aberdeen.

### Dr Donya Hajjalizadeh

Dr Donya Hajjalizadeh is a chartered engineer and senior lecturer at the University of Surrey, with more than a decade of experience in industry-focused research in the areas of structure and infrastructure health monitoring, application of machine learning approaches in data-driven damage identification systems and risk, reliability and resilience-focused decision-making in transport infrastructure and systems. As project lead, co-investigator, technical lead/co-lead, and principal/co-supervisor, she has worked and successfully delivered over 50 commercial and research projects on time and on budget. She is an active member of several professional bodies, including the Institution of Civil Engineers, the Institution of Structural Engineers, the Institution of Engineers of Ireland and the Women's Engineering Society.