About The Course
The course duration is 4 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. Reliability, availability and maintainability (RAM) Analysis will be dealt with. 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.

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 of the workshop will be £1295 + VAT (UK only) which includes course notes and lunches. You should make your own arrangements for accommodation.

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

Venue
ASRANet Ltd
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Risk Analysis & Reliability Engineering
17-20 August 2020

(A Maritime Company for Courses, Conferences and Research)
Glasgow, UK
PROGRAMME

Monday 17th August 2020

09.00 – 10.30  Lecture 1: Basic Statistics
  Dr Charis Chanialidis

10.30 – 10.45  Break

10.45 – 12.15  Lecture 2: Basic Probability
  Dr Charis Chanialidis

12.15 – 13.30  Lunch

  Dr Charis Chanialidis

15:30-17:00  Lecture 4: Hands on experience – Probability
  Dr Charis Chanialidis

Wednesday 19th August 2020

9:00– 10.30  Lecture 8: Event tree & Fault tree analysis
  Dr Charis Chanialidis

10.45 – 12.15  Lecture 10: Quantitative Risk Assessment: FMEA, FMECA and HAZOP.
  Dr Charis Chanialidis

  Dr Charis Chanialidis

  Dr Charis Chanialidis

Thursday 20th August 2020

09.00 – 10.30  Lecture 13: Structural Reliability-1
  Prof Edoardo Patelli

10.30 – 10.45  Break

10.45 – 12.15  Lecture 14: Structural Reliability-2
  Prof Edoardo Patelli

12.15 – 13.30  Lunch

13.30 – 15:30  Lecture 15: Application to Submersibles & submarine & Offshore structures
  Prof Purnendu Das

15.30 – 17.00  Lecture 16: Hands on Experience on Structural Reliability
  Prof Purnendu Das
Lecture Content

**Lecture 1**
Introduction to statistics and basic statistical terms (e.g. correlation, covariance, etc.)

**Lecture 2**
Introduction to Probability with a focus on understanding and being able to apply basic concepts (e.g. mean, variance, etc.)

**Lecture 3**
Applying the ideas of Lecture 1 in a workshop-like setting (i.e. where participants will be solving tasks on Statistics)

**Lecture 4**
Applying the ideas of Lecture 2 in a workshop-like setting (i.e. where participants will be solving tasks on Probability)

**Lecture 5**
Introduction to regression modelling techniques

**Lecture 6**
Interpretation of statistical output and data visualisation

**Lecture 7**
How can we quantify risks associated with particular hazards?

**Lecture 8**
Techniques for modelling success and failure and associating probabilities with each one.

**Lecture 9**
Introduction to Risk Analysis
Basic concept of Safety and Risk Analysis. Definition of Reliability and Availability and Resilience. Qualitative and Quantitative Risk Assessment.

**Lecture 10**
Quantitative Risk Assessment: FMEA, FMECA and HAZOP.
Introduction to the Failure mode, effects, and criticality analysis (FMEA) and Hazard and operability study analysis (HAZOP)

**Lecture 11**
Reliability & Maintainability (RAM)
Introduction to maintenance strategies and reliability-based maintenance.
Modelling and simulate components and systems.
Markov processes: basic elements
A real example of Monte Carlo Simulation for applied to an offshore production plant.

**Lecture 12**
Efficient Monte Carlo simulation methods and COSSAN software
Demonstrations by reliability software COSSAN Software.
ABOUT THE LECTURERS:

Professor Purnendu Das
BE, ME, PhD, C.Eng, C.MarEng, FRINA, FIstructE, FIMarEST

Purnendu Das is Director of the part-ship structure analysis and structural reliability analysis as applicable to various engineering structures. He has been the principal investigator of many EPSRC projects. Before joining the University of Glasgow in 1991 he worked with British Maritime Technology as Principal Structural Engineer (1984-91). He is the author of more than 250 publications, including contract reports and more than 60 journal papers and was a member of the editorial boards of the ‘Journal of Marine Structures’, ‘Journal of Ship & Offshore Structures’, ‘Journal of Engineering under Uncertainty: Hazards, Assessment and Mitigation’ and ‘Journal of Ocean and Climate System’ amongst others. His areas of research include limit state design and analysis & reliability analysis of ship & offshore structures. Professor Das has wide ranging industrial and academic contacts and has advised and supervised 20 PhD students, to his credit. Details of visits and collaborations include his various sabbatical study periods spent at University of California, Berkeley, USA (July – September 1996), at Lloyd’s Register of Shipping (August 1997), Kockums Ltd (July 1998) and spent some time at Instituto Superior Técnico (IST), Lisbon (July 2000). He has been running various successful CPD courses which are attracting many people from different industries. These courses are on ‘Fatigue & Fracture Analysis’, ‘Ships at Sea’, ‘Advanced Analysis and Design of Offshore Structures’, ‘Offshore Floating System Design’, ‘Structural Response under Fire and Blast Loading’ and ‘Design of Pipelines and Risers’ amongst others. He was a member of ISSC (International Ship and Offshore Structure Congress) for the periods of 1991-97 and 2003 – 2006. He was a member of the OMAE (Offshore Mechanics and Arctic Engineering) Organising Committee on ‘Safety and Reliability’. He has organised six ASRANet International Conferences in 2002 (Glasgow), 2004 (Barcelona), 2006 (Glasgow), 2008 (Athens), 2010 (Edinburgh) and 2012 (London) where a large number of participants from various countries attended. The theme of the conference is the integration of risk, advanced structural analysis and structural reliability analysis as applicable to various engineering structures. He was the member of Research committee of the Institution of Structural Engineers (I.Struct.E) London for 3 years (2014-2017). He was a visiting professor at Wuhan University of Technology, China from July 2016-July 2019. At present he is a visiting professor at the University of Montenegro, Montenegro.

Prof Edoardo Patelli

Edoardo Patelli is a Professor in Risk and Uncertainty and head of the Centre for Intelligent Infrastructure, at the Department of Civil and Environmental Engineering, University of Strathclyde. Before moving to the University of Strathclyde in 2019, Prof Patelli was the deputy director of the Institute for Risk and Uncertainty and co-director of the Centre for Doctoral Training in “Risk and Uncertainty” at University of Liverpool. He is also the Chair of the Technical Committee on Simulation for Safety and Reliability Analysis for the European Safety and Reliability Association (ESRA). Patelli is the principal investigator of the EPSRC projects in Resilience modelling for improved nuclear safety (EP/R020558/1) and Machine learning on-line monitoring tools (EP/M018415/1). He is also CoI on the NERC project Building UK climate resilience through bridging the qualitative-quantitative data divide (NE/S016961/1), the ESRC project “Informed mining: risk reduction through enhanced public and institutional risk awareness (IM AWARE)” - (ES/T003537/1) and “Efficient reliability analysis of complex systems”, German Research Foundation (Projekt number 335796111). Patelli has published more than 250 peer-reviewed publications in leading International journals and in Proceedings of International Conferences and 4 book chapters. He has supervised more than 25 PhD students on site and in collaboration with international partners (e.g. Dalian University and NTHU, Hannover and Grenoble). He is a guest-editor on International journals (e.g. International Journal of Reliability and Safety and Structural Safety) and editorships Springer’s “Encyclopedia of Earthquake Engineering”. He organised multi-disciplinary international conferences in risk and vulnerability (ASCE/ICVRAM-ISUMA 2014), and probabilistic analyses (e.g. IPW2015, REC2018). He is also the Chair of the Technical Committee of the 2019 European Safety and Reliability Conference (ESREL) and member of the board editor of the ASCE-ASME journal of Risk and Uncertainty. Dr. Patelli is leading an interdisciplinary research group focused on developing and apply efficient and robust computational tools for Risk, Safety and Uncertainty Quantification across different sectors (Nuclear, Energy, Aerospace, Civil, Environmental) able to deal with scarce data and vagueness of information. Recent research interests include human reliability analysis and interaction with intelligent and autonomous systems, development of robust artificial neural networks and online diagnostic tools based on machine learning for the analysis and reliability of safety critical systems. Particular emphasis on the development of resilience framework of power networks and smart grids as well the development of tools for decision making under severe uncertainty.

Dr Charalampos (Charis) Chanialidis

Charalampos (Charis) Chanialidis is a Lecturer at the University of Glasgow in the School of Mathematics and Statistics. He is also the programme director of the part-time online distance learning programmes (PgCert/PgDip/MSc) in Data Analytics within the School. These are the largest online programmes in the University comprised of 155 students from 41 different countries. These programmes are targeted at those that are already in employment since there is a strong interest in qualifications which are viewed as improving subsequent employment prospects, and there is an enormous
demand for data analytics expertise. Before that, he was a Post Doctoral Research Associate at the University of Glasgow in the School of Mathematics and Statistics and the Urban Big Data Centre, working with Marian Scott and Adrian Bowman.

He also was a Post Doctoral Research Fellow at the University College Dublin in the School of Mathematical Sciences, working with Nial Friel and a PhD student of Statistics at the University of Glasgow in the School of Mathematics and Statistics. His supervisors were Ludger Evers and Tereza Neocleous and the title of his thesis is Bayesian mixture models for count data. He obtained his MSc degree in Statistics and Operational Research at the University of Athens. His research interests include: Bayesian Inference, Computational Statistics, Markov Chain Monte Carlo Methods, Machine Learning.