

# Process Safety and Risk Management COURSE CATALOGUE



# About ACM and the Institute of Hazard Prevention

## ACM Facility Safety

Located in Calgary, AB, ACM Facility Safety is Canada's largest independent provider of Hazard Analysis, Safeguard and Risk Assessment services, and Process Hazard Analysis analytics. Our mission is to make the world a safer place through culture, process safety and technology. ACM provides expert risk consulting, process safety education and safety lifecycle software solutions, to individuals and organizations, over a wide variety of industries, that want to help make the world a safer place.

## Risk Consulting Services

ACM Facility Safety draws on extensive field experience, knowledge of IEC 61511 and the "Safety Lifecycle" to provide innovative process safety solutions in the form of risk consultation services to EPC and operating companies for the specification, design, installation, maintenance and operation of their facilities.

## SafeGuard Profiler & SafeGuard Sentinel

ACM's in-house experts have created industry-leading software tools that support the safety lifecycle and work seamlessly together to make planning, operating, monitoring and trouble-shooting their facilities comprehensive and user-friendly.

## Educational Services

ACM Facility Safety is a recognized global provider of Process Safety education, tools and methodologies. In 2012 we opened the Institute of Hazard Prevention to provide education on all elements of process safety management to individuals at all levels within an organization. Our instructors are experienced experts in all phases of the IEC 61511 Safety Lifecycle and industry best practices.

## Risk Analytics

Based on experience from performing risk assessments for thousands of projects of varying sizes across Western Canada and around the world, our risk consultants have created PHA Analytics to help you extract maximum value from your studies.

Learn which type of protection systems you are relying on the most, which safeguards are the most critical to maintain, which action items to complete first, and how you compare to the rest of your industry and to best practices.

## Institute of Hazard Prevention

ACM's Institute of Hazard Prevention is a recognized global provider of Process Safety education, tools and methodologies. Clients tell us they prefer our neutral, third party workshop oriented educational sessions developed from the real life experiences of our instructors.

ACM's Institute of Hazard Prevention provides regular opportunities for companies to learn from experts, network with industry professionals and share ideas surrounding the need to apply a 'safety first' mentality to everything they do.

The Institute is unique to Canada as the only training facility designed to help organizations elevate their understanding of the Safety Lifecycle and Risk Management, and fits perfectly under ACM's ongoing mandate to make the world a safer place.

# About Our Instructors

Our instructors come from a variety of safety backgrounds, but they all share unmatched hands-on experience in their fields and are committed to educating the next generation of safety ambassadors. ACM is a recognized global provider of Process Safety education, tools and methodologies. When you receive training from us, you will benefit from neutral, third-party, workshop oriented educational sessions developed from the real life experiences of our industry-leading instructors.

**“Very helpful instruction and activities in this course helped me get what I was looking for from it!”**

***Project Coordinator***  
*Calgary*

**“Great instructor. Lots of years of experience. Provided us with tips on facilitation and how to look at HAZOP’s and What-IF PHA’s.”**

***Process Engineer***  
*Calgary*

**“The instructor was very interactive, encouraged discussion and welcomed feedback.”**

***Process Engineer***  
*Gas Processing Facility*

**“Great course! The instructor made the course very enjoyable. With their wealth of knowledge and experience they could answer all of the questions, as well as provide a real life situation in which it applied.”**

***New Grad EIT***  
*Calgary*

**“Great course content, coverage and length. Superb instructor who presented material as it applies to real world scenarios.”**

***I&C Engineer***  
*Oilsands Company*

## HOW TO REGISTER

- Visit [www.iofhp.com](http://www.iofhp.com), select the course or workshop you would like to attend, click 'Register' and follow the necessary steps. If completing the registration on behalf of an employee, please provide an administrative contact.

- Call our Training Team at 403.264.9637 or toll-free 1.877.264.9637.

We recommend registering one month prior to the course date (though we invite you to inquire about last-minute availability).

## TRAINING FEES

Tuition fees include all manuals, course material, lunches and refreshments. Travel and accommodation costs are not included. Please do not make any non-refundable travel arrangements until we confirm your course will be held as scheduled. ACM assumes no liability for any costs incurred due to the cancellation of any classes.

Pay by VISA, MasterCard, AMEX\*, cheque or money order. (\*Payments by AMEX will incur an additional 3.25% surcharge.) Purchase orders are accepted; however, full payment must be received prior to the course date.

### **Please make cheques payable to:**

Institute of Hazard Prevention Inc.

#300, 926 – 5 Avenue SW

Calgary, Alberta T2P 0N7

## CANCELLATION POLICY

The deadline to notify ACM of a cancellation is 14 days prior to commencement of the course/event. If cancellation is received 15 days or more days prior to commencement registrants may:

- Cancel and receive a full refund
- Move to a future offering of the same course/event
- Be replaced with a colleague

If cancellation is received 14 days or fewer prior to commencement, registrants may:

- Be replaced with a colleague
- Be moved to a future offering of the same course/event. This is a one-time offering only. A registration moved to a future date remains non-refundable
- Charge the full cost of the course/event

No-shows the morning of the course/event will forfeit the entire registration fee. Medical emergencies will be addressed on a case-by-case basis.

ACM reserves the right to cancel any course/event prior to the scheduled date and will offer to register you in the next scheduled course/event or promptly refund your payment.

Please keep the cancellation policy in mind when making travel arrangements, such as airline tickets and hotel reservations. **ACM will not be responsible for any travel arrangement fees incurred by cancelling or changing travel plans.**

## CUSTOMIZED EDUCATION PROGRAMS

Customized Education Programs are available to fit the business requirements for your organization. ACM has assisted many major producers with building Education competency programs for their organization by integrating their own drawings, guidelines and processes with a flexible work schedule to fit the customer's scheduling requirements.

These courses can be held either at ACM or at an alternative convenient location for your organization, which can result in considerable savings in time, travel and accommodation costs for your company. **For more information on availability and pricing, please contact us today 403.264.9637, toll-free 1.877.264.9637 or [info@acm.ca](mailto:info@acm.ca).**

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# INTRODUCTION TO SIL / SIS FOR OPERATIONS AND MAINTENANCE TECHNICIANS



## COURSE OVERVIEW:

This **2-day workshop** objective is to give Operations and Maintenance personnel an understanding of “Functional Safety”, and the relationship of Safety Instrumented System (SIS) with respect to process and operational related hazards. The course introduces the concepts and definitions related with Process Hazards, Risk Analysis, Safety Instrumented Systems, and Functional Safety Management. It will provide some details on maintaining Safety Instrumented Systems and Safety Instrumented Functions in accordance with IEC 61511 standards and encapsulate the concepts of Safety Integrity Level with a hands-on workshop on the afternoon of day 2.



## WHO SHOULD ATTEND:

Anyone who works in close proximity to hazardous processes such as Operations and Maintenance Personnel, Supervisors, Engineers and Safety Professionals who require a sound understanding of risk and risk management.

- Maintenance personnel
- Field and control room operators
- Instrument and Electrical technicians
- Technicians involved in the commissioning, testing, operation, maintenance support, modification and change management of Safety Instrumented Systems for process plant applications



## COURSE OUTLINE:

- SIL Determination, Layers of Protection Analysis (LOPA)
- What are SIL / SIS?
- Review of Company specific SIF's (including P&ID's)
- How do we go about changing the SIS?
- Why do we need to proof test and what is required?
- What records are needed for change, testing, etc.?
- What engineering processes are needed to conform to IEC-61511?
- What operations processes (e.g. MOC/Impairment) are needed?
- How is the system audited?
- Installation and Commissioning
- Operations and Maintenance



## PREREQUISITES OR RELATED COURSES:

There are no prerequisites for this course. However, this course is an ideal prerequisite for Operations and Maintenance personnel to show Leadership in process safety.

### Course Fee

**\$1,795 CAD** *per student*

2 days

Includes registration, lunch and refreshments, and course materials.

Does not include applicable taxes.

# P&ID (PIPING AND INSTRUMENTATION DIAGRAM) AND ENGINEERING DRAWINGS INTERPRETATION



## COURSE OVERVIEW:

To effectively assess emergency situations and evaluate safety, environmental and regulatory compliance issues, accurate drawings – and the ability to interpret them – are crucial. In this **2-day** course, a combination of classroom instruction and workshop training exercises focuses on critical documentation essential to the safe day-to-day operation of facilities (e.g., P&ID, PFD, Plot Plan, Electrical Area Classification, Piping Drawing, Isometric Drawing, Line List, Tie-In List and Shutdown Keys).



## WHO SHOULD ATTEND:

This course focuses on engineering drawings typically used in the chemical and process industries by engineers and technologists in the design phase, and by operations and maintenance staff once facilities are up and running. It is suitable for employees, managers, officers of corporations and anyone else with an interest in how these drawings should be created, maintained and used in assessing emergency situations and regulatory compliance issues.

- Facilities, Operations and Maintenance Professionals
- Engineers In Training (EITs)
- I & C, Mechanical Engineers and Technologists
- Professionals responsible for Process Hazards Analysis / HAZOP / Safeguarding studies
- Health & Safety / HSE Professionals



## COURSE OUTLINE:

- Preliminary Engineering Drawings
- Piping and Instrumentation Diagrams
- Checkpoint Exercise
- Interpreting P&IDs – Valves
- Interpreting P&IDs – Equipment
- Exercise #1 – Interpreting P&IDs
- Interpreting P&IDs – Control & Safety Systems
- Exercise # 2 – Control & Safety Systems
- Detailed Engineering Drawings
- Engineering Drawings for Construction and Operation
- Capstone Exercise



## PREREQUISITES OR RELATED COURSES:

There are no prerequisites for this course. However, this course lays the foundation for:

- PH & RA ENG TÜV (Rheinland) Certificate
- PHA / HAZOP Facilitation

### Course Fee

**\$1,495 CAD** *per student*

2 days

Includes registration, lunch and refreshments, and course materials.

Does not include applicable taxes.



# FUNDAMENTALS OF INSTRUMENTATION AND CONTROLS (I&C) FOR PROCESS SAFETY



## COURSE OVERVIEW:

This **2-day course** includes instruction on the fundamentals of instrumentation and controls (I&C) as they apply to the oil and gas industry. I&C provides the basic building blocks for all automated control systems which we observe in every modern operating facility. Solid, robust and reliable I&C not only ensures efficient and profitable plant operations, but also includes safe functionality of the process, protection of the environment, and regulatory compliance when required. This workshop provides the opportunity for the participants to obtain a solid understanding of various technologies used for process measurements, final control elements and basic regulatory controls, including an understanding of common pitfalls related to design, maintenance and operational issues of instrumentation and controls.



## WHO SHOULD ATTEND:

The knowledge and understanding provided in this course is typically required by engineers and technologists in the design phase, and by operations and maintenance staff once facilities are up and operating. This workshop is suitable for anyone with an interest in how instrumentation and control systems should be designed, maintained and improved. This provided knowledge can also be used in assessing process safety, emergency situations and regulatory compliance issues.

- Facilities, Operations and Maintenance Professionals
- Engineers In Training (EITs)
- I & C, Mechanical Engineers and Technologists
- Engineering Managers, Project Engineers and Project Managers
- Professionals responsible for Process Hazards Analysis / HAZOP / Safeguarding studies
- Health & Safety / HSE Professionals



## COURSE OUTLINE:

- Field measurement devices including level, pressure, temperature flow
- Final control elements, including a step by step approach to sizing control valves
- Basic control theory
- Common control algorithms
- Key design, maintenance and operations I&C considerations



## PREREQUISITES OR RELATED COURSES:

The following workshop, or equivalent knowledge, experience and training, is a prerequisite.

- Engineering Drawings Interpretation - Piping And Instrumentation Diagrams (P&ID) Training
- In addition, this course provides the basic foundation for:
- PHA / HAZOP Facilitation
  - PH & RA ENG TÜV (Rheinland) Certificate

## Course Fee

**\$1,895 CAD per student**

2 days

Includes registration, lunch and refreshments, and course materials.

Does not include applicable taxes.





## COURSE OVERVIEW:

Through this **1-day** Process Hazard Analysis / Hazard and Operability Study (PHA/HAZOP) overview training, you will learn the theory behind conducting these studies and why they matter. You will learn the principles behind each of the major PHA methods (HAZOP, What-if?, Checklist, FMEA) and the attributes of each methodology.



## WHO SHOULD ATTEND:

This course will be of benefit to anyone involved in PHAs as a participant but not as a leader of the group. Registrants do have the option to attend the full 3 day PHA/HAZOP Facilitation Training if they wish to develop the ability to lead PHA studies.

- PHA / HAZOP Scribes
- Health and Safety / HSE Professionals
- Process Safety Management (PSM) / Loss Management Specialists
- Supervisors, Managers, and Engineers responsible for PHA studies



## COURSE OUTLINE:

- Quantitative & Qualitative Hazard Analysis
- Overview of HSE Hazard Management
- Elements of Facility Risk
- PHA Team Dynamics
- PHA Methods:
- HAZOP (Hazard and Operability Study)
- Preliminary Hazards Analysis
- Checklist Analysis
- What-If? Analysis
- Checklist / What-If? Analysis
- FMEA (Failure Modes & Effects Analysis)



## PREREQUISITES OR RELATED COURSES:

It is recommended that participants have completed the following training course:

- Engineering Drawings Interpretation – Piping and Instrumentation Diagrams (P&ID)

### Course Fee

**\$895 CAD** *per student*

1 day

Includes registration, lunch and refreshments, and course materials.

Does not include applicable taxes.



## COURSE OVERVIEW:

This **2-day course** is designed to give operations and technical personnel a basic understanding of the principles of process safety management. The course is designed to be interactive, using both group work and case studies to reinforce the learning and understanding.

This overview course is based upon the Risk Based Process Safety Approach developed by the Center for Chemical Process Safety published in 2007. It also takes into consideration the Canadian Society for Chemical Engineering (CSCHE) PSM standard.

**Note:** this course can be adapted to your current organization's safety program.



## WHO SHOULD ATTEND:

- Anyone who is working in close proximity to hazardous processes such as Operations and Maintenance Personnel, Supervisors, Engineers and Safety Professionals.
- Anyone who wishes to gain a better understanding of process safety and the application of the principles to facilities handling hazardous materials.



## COURSE OUTLINE:

- The differences and similarities of occupational and process safety systems and how they work together
- A comparison of current Industry Standard PSM programs
- The importance of each PSM component
- Some key details of each component
- How the application of each element impacts daily work activities
- More knowledge to help you work safely
- How you can use comparisons and analytical approaches to investigate areas that need further investigation
- How PSM integrates into your current safety management system and implementing key aspects of PSM with the field workforce



## PREREQUISITES OR RELATED COURSES:

The following workshop, or equivalent knowledge, experience and training, is a prerequisite.

- Engineering Drawings Interpretation - Piping And Instrumentation Diagrams (P&ID) Training

In addition, this course provides the basic foundation for:

- PHA / HAZOP Facilitation
- PH & RA ENG TÜV (Rheinland) Certificate

### Course Fee

**\$1,495 CAD** *per student*

2 days

Includes registration, lunch and refreshments, and course materials.

Does not include applicable taxes.



## COURSE OVERVIEW:

Over this **2-day course**, participants will experience the Safety Lifecycle, starting from the conceptual phase of a project right through to operations. The course starts with a solid understanding of how to capture and present risk at your facility using software, then addresses using the results of your Process Hazard Analyses, SIL Determination (LOPA), as well as SIL Verification information, and ends by looking at ways of managing risk in real time during operations and maintenance.

From a good P&ID to a great contingency safety plan for operations, many people are involved in this process and it's important to understand where the information is transferred and how each phase of the project relates to the next, all being managed with the use of dedicated software tools. The data collected in the initial stages of your new or existing project will ultimately have an impact on how your operators run the plant, and so it is important to know how to ensure nothing is missed or forgotten, so you can prevent hazardous scenarios from occurring.

This course is not just for the experts but is a valuable overview for anyone involved in hazard prevention and risk management at any level. No knowledge of the IEC 61511 guidelines or other standards is required to participate. Past course participants have ranged from Vice Presidents to Project Managers and Engineers.



## WHO SHOULD ATTEND:

- Anyone who works in close proximity to hazardous processes such as Operations and Maintenance Personnel, Supervisors, Engineers and Safety Professionals who require a sound understanding of risk and risk management.
- Engineers involved in facilities design and construction will especially benefit from this course.



## COURSE OUTLINE:

### 1) Front End Design Phase:

- Process Hazard Analysis
- PHA Documentation
- PHA Analytics

### 2) Detailed Design Phase:

- Layer of Protection Analysis, LOPA (SIL Determination, Contingency Planning, Safety Requirement Specifications)
- SafeGuard Profiler: SIL-D Module

### 3) Implementation Phase:

- Safety Integrity Level Verification/Validation
- SafeGuard Profiler: SIL-V Module

### 4) Continuing Operation:

- Operations
- SafeGuard Sentinel – Real Time Risk Exposure



## PREREQUISITES OR RELATED COURSES:

It is recommended that participants have completed the following training courses:

- Engineering Drawings Interpretation – Piping and Instrumentation Diagrams (P&ID)
- It is also recommended to complete the Practical Risk Assessment and Hazard Identification and Awareness courses.

## Course Fee

**\$1,495 CAD** *per student*

2 days

Includes registration, lunch and refreshments, and course materials.

Does not include applicable taxes.

# INTRODUCTION TO CONTROLS HAZARDS & OPERABILITY (CHAZOP) STUDY



## COURSE OVERVIEW:

This **1-day workshop** is designed to deliver expert instruction on the technical content of a CHAZOP session and why they are performed. This includes understanding the principles behind each of the major methods (CHAZOP, What-if? and FMEA) with a focus on the fundamentals of the CHAZOP methodology, noding, team composition, and preparation for a CHAZOP session.



## WHO SHOULD ATTEND:

- Automation technologists and engineers
- IT professionals
- Automation suppliers and vendors
- Supervisors, managers and engineers responsible for CHAZOP studies



## COURSE OUTLINE:

- What is a CHAZOP?
- CHAZOP Choices
- Methodology
- Course Exercise #1
- Documentation
- Teams
- Course Exercise #2
- CHAZOP Preparation



## PREREQUISITES OR RELATED COURSES:

It is recommended that participants have completed the LOPA Workshop.

### Course Fee

**\$895 CAD** *per student*

1 day

Includes registration, lunch and refreshments, and course materials.

Does not include applicable taxes.



## COURSE OVERVIEW:

This **3-day course** is designed to deliver expert instruction on how to successfully plan and execute Process Hazards Analysis (PHA) studies efficiently and effectively. This includes understanding the principles behind each of the major PHA methods (HAZOP, What-if?, Checklist, FMEA), learning how to deal with challenging personalities within the PHA team, how to avoid common pitfalls and traps so your PHA studies run smoothly.



## WHO SHOULD ATTEND:

- Supervisors, Managers and Engineers responsible for PHA studies
- PHA / HAZOP Team Leaders & Scribes
- Health & Safety / HSE professionals
- Process Safety Management (PSM) / Loss Management specialists



## COURSE OUTLINE:

- Quantitative & Qualitative Hazard Analysis
- Overview of HSE Hazard Management
- Elements of Facility Risk
- PHA Teams
- PHA Methods:
  - HAZOP
  - Preliminary Hazards Analysis
  - Checklist Analysis
  - What-If? Analysis
  - Checklist / What-If? Analysis
  - FMEA
- Method Selection Criteria
- PHA Documentation Issues
- PHA Leadership:
  - PHA Facilitation Skills
  - Team Leader Qualifications
  - PHA Leader Responsibilities
  - PHA Group Dynamics
- PHA Workshop:
  - HAZOP "Practice" Study
  - What-If? "Practice" Study



## PREREQUISITES OR RELATED COURSES:

It is recommended that the following courses be completed prior to attending this course:

- P&ID (Piping and Instrumentation Diagram) and Engineering Drawings Interpretation

### Course Fee

**\$2,200 CAD** per student

3 days

Includes registration, lunch and refreshments, and course materials.

Does not include applicable taxes.

# LOPA (SIL DETERMINATION)

PLEASE ALSO SEE PART 2: SIL VERIFICATION



## COURSE OVERVIEW:

This **2-day course** is designed to deliver expert instruction on how to successfully plan and execute Safety Integrity Level (SIL) Determination studies efficiently and effectively, at the right stage of the Safety Lifecycle, and in accordance with the IEC 61511 standard. This includes understanding the principles behind two of the most commonly used SIL Determination methods (Layer of Protection Analysis and Calibrated Risk), and learning how to avoid common pitfalls and traps so your studies run smoothly.

**Note:** The SIL Determination / LOPA course may be taken in conjunction with the SIL Validation Workshop to gain a more thorough understanding of the Safety Lifecycle process.



## WHO SHOULD ATTEND:

- This course teaches all the requirements to prepare team leaders facilitate and document SIL Determination studies, including:
  - Risk Assessment specialists
  - SIL / PHA / HAZOP team leaders & scribes
  - Process Safety Management (PSM) / Loss Management specialists
  - Supervisors, managers and engineers responsible for SIL studies
  - Project managers who need to understand the concepts and principles of IEC 61508 & 61511
  - Engineers involved in any aspect of the SIS Safety Lifecycle



## COURSE OUTLINE:

- Background to SIL Determination
- SIL Determination Methods
- SIL Determination Method Selection Criteria
- SIL Documentation Issues
- SIL Teams
- SIL Practices
- SIL Determination Workshop
  - Calibrated Risk Graph
  - Layer of Protection Analysis (LOPA)
  - Safety Layer Matrix



## PREREQUISITES OR RELATED COURSES:

Participants should understand the process of executing a HAZOP study and be familiar with typical HAZOP reports. Participants should have some understanding of critical protection systems.

### Course Fee

**\$1,495 CAD per student**

2 days

Includes registration, lunch and refreshments, and course materials.

Does not include applicable taxes.



## COURSE OVERVIEW:

This **2-day course** is designed to provide participants with the tools necessary to perform SIL Verification studies compliant with the IEC 61511 standard. This practical course uses real life examples to demonstrate to students how to conceptually design multiple Safety Instrumented Functions (SIFs) to meet the specified safety integrity levels, including how the key elements such as the Safety Requirements Specification (SRS) impacts the engineering of an SIS.

**Note:** The SIL Verification course may be taken in conjunction with the LOPA (SIL Determination) course to gain a more thorough understanding of the Safety Lifecycle process.



## WHO SHOULD ATTEND:

- This course teaches Functional Safety Engineering fundamentals to engineers and technologists responsible for designing Safety Instrumented Systems, including:
- I & C Team Leaders, engineers and technologists
- High Integrity and Critical Control System specialists
- Supervisors, managers and engineers responsible for ensuring that SIS have been designed to appropriately mitigate the level of risk specified
- Engineers involved in any aspect of the SIS Safety Lifecycle



## COURSE OUTLINE:

- Fundamentals of Safety Instrumented Systems(SIS) using the IEC 61511 standard
- Safety Requirement Specification of the SIS
- SIS Design & Engineering to meet the specified Safety Integrity Levels
- SIS Installation, Commissioning & Validation
- SIS Engineering Workshop



## PREREQUISITES OR RELATED COURSES:

Participants should have some understanding of critical protection systems. Participants are **REQUIRED** to have completed the LOPA (SIL Determination) course.

### Course Fee

**\$1,495 CAD per student**

2 days

Includes registration, lunch and refreshments, and course materials.

Does not include applicable taxes.



# F.S. ENG. PROCESS HAZARDS & RISK ANALYSIS (PH & RA) TÜV (RHEINLAND) CERTIFICATION

## FUNCTIONAL SAFETY ENGINEERING CERTIFICATION – PROCESS HAZARDS & RISK ANALYSIS, TÜV (RHEINLAND) FUNCTIONAL SAFETY PROGRAM



### COURSE OVERVIEW:

The TÜV (Rheinland) Functional Safety Program supports engineers or any person working in the functional safety business. It supports the professional development of practitioners in the field of functional safety by incorporating the principles of IEC 61822 and REVISED IEC 61511:2016-2nd EDITION, and other relevant international standards into a training course designed to add to their depth of knowledge and understanding of the subject. The program also offers engineers who possess significant work experience in the field of functional safety the ability to obtain a certificate verifying their expertise. For more information, refer to [www.tuvasi.com](http://www.tuvasi.com).

ACM's TÜV (Rheinland) **Functional Safety Engineering** training course within the TÜV (Rheinland) Functional Safety Program has been reviewed and accepted by TÜV (Rheinland) Industrie Service GmbH - Automation, Software and Information Technology (ASI).



### WHO SHOULD ATTEND:

- PHA / HAZOP Team Leaders & Scribes
- Health & Safety / HSE Professionals
- Process Safety Management (PSM) / Loss Management Specialists
- Supervisors, Managers and Engineers responsible for PHA studies
- F.S. Eng. Certified Professionals



### COURSE OUTLINE:

- Overview of TÜV (Rheinland) Program
- Introduction to Process Hazard and Risk Analysis
- Standards Overview
- Process Safety Management
- Process Hazard & Risk Analysis Methods
  - HAZOP
  - What-If, What-If / Checklist
  - FMEA
  - Allocation of Safety Functions to Protection Layers
- Process Hazard & Risk Analysis Methods (continued)
  - ALARP (concept) / Tolerable Frequency
  - Calibrated Risk Graph / Safety Layer Matrix
  - Layer of Protection Analysis, LOPA
- Fault Tree Analysis, FTA
- Event Tree Analysis, ETA
- System Safety Requirements
- Reporting – Recording
- Selection of a Hazard Analysis Technique
- F.S. Eng. PH&RA Exam (4.5 hours)



### PREREQUISITES OR RELATED COURSES:

In accordance with the TÜV (Rheinland) Functional Safety Program guidelines, students should possess:

- A minimum of 3 to 5 years' experience in the field of functional safety;
- University degree or equivalent engineer level responsibilities status as certified by employer.

Participants are eligible to receive a TÜV Rheinland certificate and to use the title "Functional Safety Engineer PH&RA TÜV (Rheinland)" concerning Process Hazards & Risk Analysis within the TÜV Rheinland Functional Safety Program provided that they:

- Attend ACM's TÜV (Rheinland) Functional Safety Engineer Program training in Process Hazards & Risk Analysis;
- Pass the Final Exam after attending the ACM Automation Inc. provided training;
- Meet all other eligibility criteria according to the TÜV Rheinland Functional Safety Program.

**Note:** Participants who meet these requirements without a professional engineer designation (i.e. Technologists) will be given the option of selecting either the "Functional Safety Engineer TÜV (Rheinland)" or "TÜV (Rheinland) Functional Safety Qualified" title.

### Course Fee

**\$3,300 CAD per student**

3 days + ½ day for exam

Includes registration, lunch and refreshments, and course materials.

Does not include applicable taxes.



## COURSE OVERVIEW:

This **2-day course** comprises combined classroom instruction and workshop exercises.

SafeGuard Profiler is a field proven, IEC compliant Safety Integrity Level (SIL) Life Cycle tool that gives high integrity and critical control systems designers, engineers, operators and maintainers the information and power to conduct SIL Determination, Validation and Optimization exercises. This 2-day workshop has been designed to offer hands-on instruction on the use of this world-class SIL Lifecycle tool. The range of topics that will be covered in this interactive session include importing HAZOP data, performing SIL Determination studies using Risk Graph and LOPA, SIF Loop Verification, SRS, and reporting.



## WHO SHOULD ATTEND:

This course is well suited to engineers and technologists who aim to follow the best engineering practices with regard to the application of Safety Instrumented Systems in the process industry, including:

- TÜV Functional Safety Engineers or TÜV Functional Safety Experts
- SIS Expert at plant
- High Integrity and Critical Control System specialists
- I & C Team Leaders, Engineers and Technologists
- SIL Determination / LOPA Team Leaders & Scribes
- Engineers involved in any aspect of the SIS Safety Lifecycle



## COURSE OUTLINE:

- The Safety Lifecycle (SLC)
- Introduction to SafeGuard Profiler
- What is SIL Determination (SIL-D)?
- What is SIL Verification (SIL-V)?
- Safety Requirements Specifications (SRS)
- Installing and using SafeGuard Profiler
- Importing and exporting projects
- Configuring SafeGuard Profiler
- Importing HAZOP data and preparing for SIL-D
- SIL-D using LOPA Scenario Analysis
- Risk Graph Analysis
- SIF Loop Verification (RBD, PFD)
- Contingency Planning and Risk Exposure
- Reporting
- External interface: Instrument tag data, CSV files, Excel files and failure rate data
- Guided examples and exercises



## PREREQUISITES OR RELATED COURSES:

It is recommended that the following courses be completed prior to attending this course:

- P&ID (Piping and Instrumentation Diagram) and Engineering Drawings Interpretation
- Introduction to PHA/HAZOP

**Private session only. Call for details 403.264.9637**

2 days



### COURSE OVERVIEW:

This informative **one day** session is designed to summarize and highlight the changes within Edition 2 of IEC 61511:2016. The session offers F.S. Engineers, or industry practitioners, who additionally possess significant work experience in the field of functional safety, the ability to keep updated with the new standard IEC 61511:2016, Ed. 2 increasing their expertise.



### WHO SHOULD ATTEND:

This session is well suited to engineers and technologists who aim to follow the best engineering practices with regard to the application of Safety Instrumented Systems in the process industry, including:

- Risk professionals responsible for establishing corporate tolerable risk targets
- Managers / Team Leaders responsible for determining SIS design standards
- Engineers and technicians responsible for ensuring that SIS have been designed to appropriately mitigate the level of risk identified
- Project Managers who need to understand the concepts and principles of IEC 61508 & 61511
- Engineers involved in any aspect of the SIS Safety Lifecycle
- Original Equipment Manufacturers, OEMs, such as manufacturers for Boilers, Compressors, Furnaces, Burner systems, Flare systems, etc.



### COURSE OUTLINE:

- Overview of International Electro technical Commission, IEC.
- Introduction and overview of the Safety Instrumented Systems Standard IEC 61511
- Overview of differences between the 1st and 2nd editions of IEC 61511
- SIF mode of operation
- New requirements for Functional Safety Management, FSM
- New requirements for Functional Safety Assessments, FSA
- More detailed requirements for SIS verification activities
- New requirements for security risk assessment
- New BPCS considerations
- Additional requirements for SIF bypasses
- New documentation requirement the "Safety Manual"
- New requirements for hardware fault tolerance, HFT. (SFF)
- Requirements for better substantiation of the failure rate data
- "Prior Use" defined and new requirements – Systematic integrity – "Proven in Use"
- Proof testing of SIF clarified
- New requirements for systematic capability, SC, systematic integrity
- New requirements for formal procedures to manage competence
- Other generic topics



### PREREQUISITES OR RELATED COURSES:

In accordance with the TÜV (Rheinland) Functional Safety Program guidelines, it is recommended that persons registering for this informative session have a background in the use of the previous IEC 61511 standard.

### Course Fee

**\$875 CAD per student**

1 day

Includes registration, lunch and refreshments, and course materials.

Does not include applicable taxes.



### COURSE OVERVIEW:

The TÜV (Rheinland) Functional Safety Program supports engineers or any person working in the functional safety field. It supports the professional development of practitioners in the field of functional safety by incorporating the principles of REVISED IEC 61511:2016-2nd EDITION, and other relevant international standards into a training course designed to add to their depth of knowledge and understanding of the subject. The program also offers engineers who possess significant work experience in the field of functional safety the ability to obtain a certificate verifying their expertise. For more information, refer to [www.tuvasi.com](http://www.tuvasi.com).

ACM's TÜV (Rheinland) **Functional Safety Engineering** training course within the TÜV (Rheinland) Functional Safety Program has been reviewed and accepted by TÜV (Rheinland) Industrie Service GmbH - Automation, Software and Information Technology (ASI).



### WHO SHOULD ATTEND:

This course is well suited to engineers and technologists who aim to follow the best engineering practices with regard to the application of Safety Instrumented Systems (SIS) in the process industry, including:

- Risk professionals responsible for establishing corporate tolerable risk targets
- Managers / Team Leaders responsible for determining SIS design standards
- Engineers and technicians responsible for ensuring that SIS have been designed to appropriately mitigate the level of risk identified
- Project Managers who need to understand the concepts and principles of IEC 61508 & 61511
- Engineers involved in any aspect of the SIS Safety Lifecycle



### COURSE OUTLINE:

- Overview of TÜV (Rheinland) Program
- Introduction to Safety Instrumented Systems
- Overview of REVISED IEC 61511:2016-2<sup>nd</sup> Edition Standard
- Management of Functional Safety
- Hazard & Risk Analysis
- Allocation of Safety Functions to Protection Layers
- SIL Determination Methods
  - Fault Tree
  - Safety Layer Matrix
  - Calibrated Risk Graph
  - LOPA
- Safety Requirements Specification
- SIS Design & Engineering
- Installation, Commissioning & Validation
- Operation & Maintenance
- Modification
- Decommissioning
- Verification
- Assessment & Auditing
- SLC Structure & Planning
- F.S. Eng. SIS Exam (4.5 hours)



### PREREQUISITES OR RELATED COURSES:

In accordance with the TÜV (Rheinland) Functional Safety Program guidelines, students should possess:

- A minimum of 3 to 5 years' experience in the field of functional safety;
- University degree or equivalent engineer level responsibilities status as certified by employer.

Participants are eligible to receive a TÜV Rheinland certificate and to use the title "Functional Safety Engineer PH&RA TÜV (Rheinland)" concerning Process Hazards & Risk Analysis within the TÜV Rheinland Functional Safety Program provided that they:

- Attend ACM's TÜV (Rheinland) Functional Safety Engineer Program training in Process Hazards & Risk Analysis;
- Pass the Final Exam after attending the ACM Automation Inc. provided training;
- Meet all other eligibility criteria according to the TÜV Rheinland Functional Safety Program.

**Note:** Participants who meet these requirements without a professional engineer designation (i.e. Technologists) will be given the option of selecting either the "Functional Safety Engineer TÜV (Rheinland)" or "TÜV (Rheinland) Functional Safety Qualified" title.

### Course Fee

**\$4,300 CAD per student**

4 days + ½ day for exam

Includes registration, lunch and refreshments, and course materials.

Does not include applicable taxes.



## Process Safety Discussion Group

Are you Passionate about Process Safety?

Here's an opportunity to network, learn and share with like minded individuals who are passionate about Process Safety. Be prepared to share your experience and knowledge on topics of interest, clarify problems, explore experiences, and discuss willingness for change. We want to make a difference both personally and for your peers, colleagues and employees. The meeting will begin with a round table discussion on topics brought to the session by attendees, after which two or three topics will be chosen by the group to discuss at length. After the discussion, there will be a presentation on a safety topic by a guest speaker, followed by a networking session.

**NEW: Complimentary attendance**

Visit: [www.acm.ca/psdg](http://www.acm.ca/psdg) to learn more

**Date:** Visit [www.acm.ca/psdg](http://www.acm.ca/psdg) for upcoming dates  
**Time:** 2:00pm – 5:00pm  
**Address:** #300, 926 5<sup>th</sup> Ave SW,  
Calgary, AB, T2P 0N7

# Location & Travel Considerations

The ACM Head Office and Institute of Hazard Prevention are located at:

**#300, 926 – 5 Avenue SW**  
**Calgary, Alberta, Canada**

## TRAVEL

The ACM Head Office and Institute of Hazard Prevention are located in downtown Calgary, approximately 20 km (30 minutes) from the Calgary International Airport YYC. For driving directions please refer to Google Maps.

It is an approximately 5 minute walk from the 7<sup>th</sup> Street (Westbound) and 8<sup>th</sup> Street (Eastbound) CTrain stations. The CTrain is Calgary's Light Rail Transit (LRT) system.

## HOTELS NEARBY

- Sandman Hotel Calgary City Centre
- Ramada Hotel Downtown
- Holiday Inn Express Hotel & Suites
- The Westin Calgary

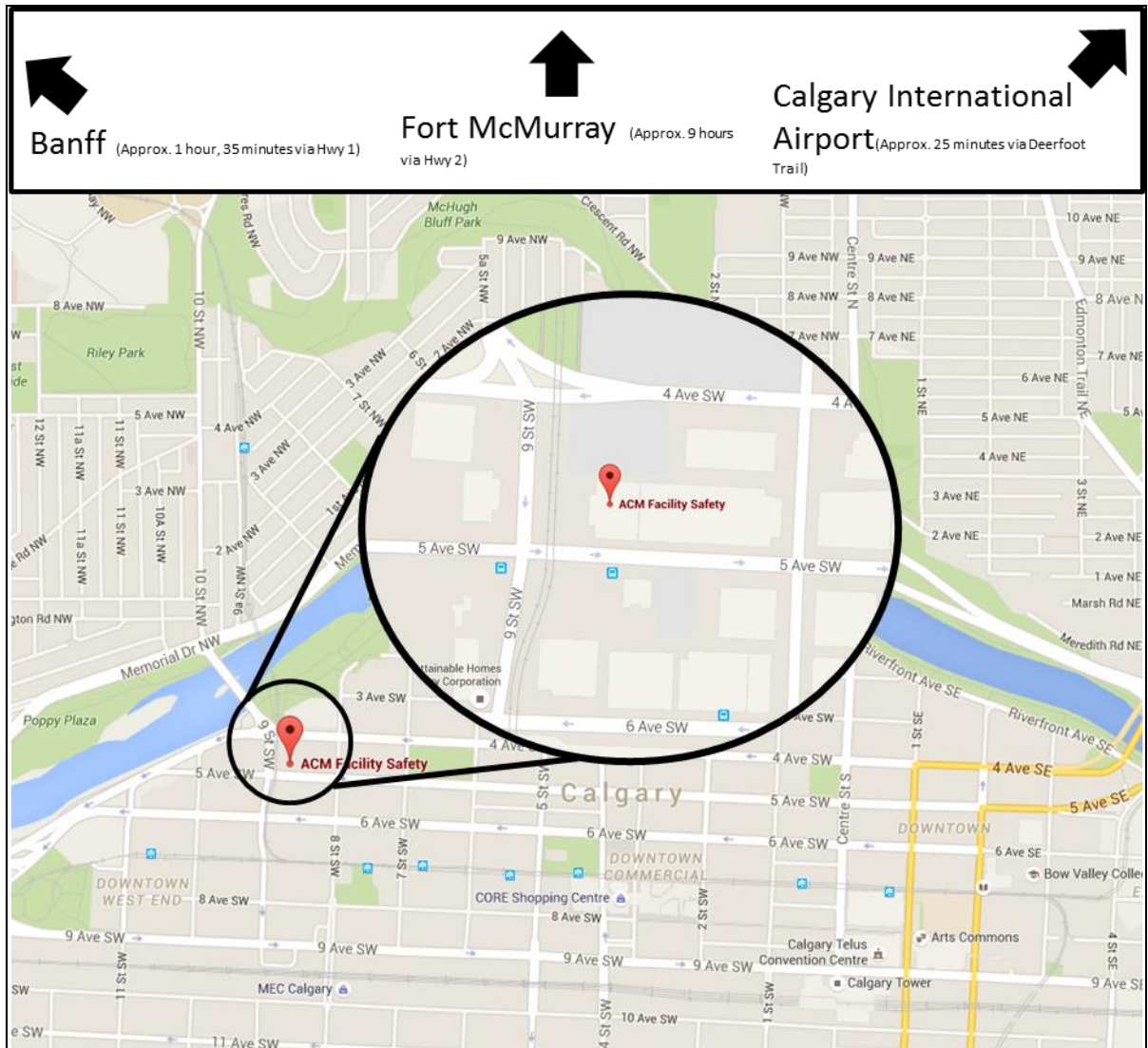
## TAXI SERVICES

- Associated Cab: 403.299.1111
- Delta Cab: 403.278.9999
- Checker Yellow Cab: 403.299.9999
- #TAXI (#8294) from your mobile device to access all Calgary taxi services

## ATTIRE & SUPPLIES

Casual attire is acceptable for all ACM Education programs. Please bring a pen or pencil and notepad. All additional course materials will be supplied by ACM.





## HOW TO REGISTER

- Visit [www.iofhp.com](http://www.iofhp.com), select the course or workshop you would like to attend, click 'Register' and follow the necessary steps. If completing the registration on behalf of an employee, please provide an administrative contact.
- Call our Training Team at 403.264.9637 or toll-free at 1.877.264.9637.

We recommend registering one month prior to the course date (though we invite you to inquire about last-minute availability).



# ***Helping you make your world a safer place***

We help the world's largest operating and engineering companies improve facility uptime, manage process risk and comply with international safety standards. Here is a list of those companies we've helped along the way:



Suncor  
Husky Energy  
Agrium • NWR • Veresen  
Spectra Energy • CNRL  
Cenovus Energy • Enbridge  
TransCanada Pipeline • MEG Energy • Keyera Corp  
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Imperial Oil • Shell • Noble Energy • Co-op Refinery  
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Morgan • Access Pipeline • TransGas • Plains  
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**[www.iofhp.com](http://www.iofhp.com)**

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**T: 403.264.9637 or 1.877.264.9637**

**F: 403.264.6671**



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