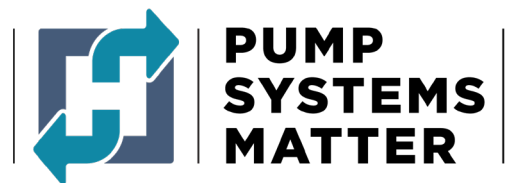


Hydraulic Institute and Pump Systems Matter

# Training Development Playbook

Processes and Best Practices



Hydraulic Institute  
and Pump Systems Matter

# Training Development Playbook

**Process and Best Practices**

Sponsor  
**Hydraulic Institute**  
**Pump Systems Matter**  
[www.Pumps.org](http://www.Pumps.org)  
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## Foreword

### Purpose and Aims of the Hydraulic Institute

The purpose and aims of the Hydraulic Institute are to drive all Pump System stakeholders towards a sustainable future by:

- a) Advancing Solutions for Pump System Performance and Efficiency
- b) Developing Standards and Technical Resources
- c) Educating the Global Marketplace
- d) Advocating for the Industry

### Purpose of Document

Hydraulic Institute Standards, Guidelines, Specifications, Program Guidelines, and Papers are adopted in the public interest and are designed to help eliminate misunderstandings between the manufacturer, the purchaser, and/or the user and to assist the purchaser in selecting and obtaining the proper product for a particular need. Use is completely voluntary and does not in any respect preclude a member from manufacturing or selling products which are not conforming.

### Definition of Documents

#### Hydraulic Institute Standard

Quoting from Article XV, Standards, of the By-Laws of the Institute, Section B:

“An Institute Standard defines the product, material, process or procedure with reference to one or more of the following: nomenclature, composition, construction, dimensions, tolerances, safety, operating characteristics, performance, quality, rating, testing and service for which designed.”

#### Hydraulic Institute Guideline

A Hydraulic Institute Guideline is not normative. The guideline is tutorial in nature, to help the reader better understand the subject matter.

#### Hydraulic Institute Program Guideline

A Hydraulic Institute Program Guideline outlines a normative process that must be followed to participate in the Program.

#### Hydraulic Institute Specification

A Hydraulic Institute Specification precisely and clearly states requirements that are suitable for incorporating into contract terms. In addition to the stated requirements, it may state options, and provide external references, notes to the specifier, datasheets, or other useful content. All content that is optional or is not a stated requirement shall not conflict with the stated requirements.

#### Hydraulic Institute White Paper

A Hydraulic Institute White Paper defines a product, material, process or procedure with reference to one or more of the following: nomenclature, composition, construction, tolerances, operating characteristics, applications, performance, quality, rating, acceptability criteria, testing and service for which designed.

#### Hydraulic Institute Body of Knowledge

A Hydraulic Institute Body of Knowledge, defines training or knowledge requirements for the pump industry, which can be used by entities interested in developing training or certification for industry professionals.

### Comments from Users

Comments from users of this standard will be appreciated, to help the Hydraulic Institute prepare even more useful future editions. Questions arising from the content of this standard may be directed to the Technical Director of the Hydraulic Institute. If appropriate, the inquiry will then be directed to the appropriate technical committee for provision of a suitable answer.

### Revisions

American National Standards of the Hydraulic Institute are reviewed on a periodic basis and may be reaffirmed, revised, or withdrawn as appropriate. Errata or addenda may be issued between revisions to address limited changes. Should an errata or addenda occur, details of the changes can be found on the publication's product page at [www.pumps.org](http://www.pumps.org).

## Disclaimer

This document was prepared by the Hydraulic Institute. Neither the Hydraulic Institute, Hydraulic Institute committees, nor any person acting on behalf of the Hydraulic Institute: 1) makes any warranty, expressed or implied, with respect to the use of any information, apparatus, method, or process disclosed in this document or guarantees that such may not infringe privately owned rights; 2) assumes any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method, or process disclosed in this guideline. The Hydraulic Institute is in no way responsible for any consequences to an owner, operator, user, or anyone else resulting from reference to the content of this document, its application, or use.

This document does not contain a complete statement of all requirements, analyses, and procedures necessary to ensure safe or appropriate selection, installation, testing, inspection, and operation of any pump or associated products. Each application, service, and selection is unique with process requirements that shall be determined by the owner, operator, or its designated representative.

## Units of Measurement

Metric units of measurement are used, and corresponding US customary units appear in parentheses. Charts, graphs, and sample calculations are also shown in both metric and US customary units. Because values given in metric units are not exact equivalents to values given in US customary units, it is important that the selected units of measure to be applied be stated in reference to this standard. If no such statement is provided, metric units shall govern.

## Committee List

A working committee met many times to facilitate its development. At the time it was developed, the committee had the following members:

**Chair** – Scott Tystad, Pentair

**Vice-chair** – Kelly Tappa, ABB Motion

### Committee Member

Zeljko Terzic  
Christopher Michalos  
Sheila Mitchell  
Tomas Dobrovolskis  
Christen Mancini  
Ravindra Birajdar  
Bruce Ticknor  
Kristen Aramthanapon  
Kendall Martin  
Dominik Fry  
Rodney Mrkvicka  
Gregory Case  
Steve Cooke  
Tammy Moskal

### Company

Armstrong Fluid Technology  
Brown and Caldwell  
Flowserve Corporation  
Hidrostat North America  
Hydro, Inc.  
Kirloskar Brothers Ltd.  
McMillen, LLC  
NEEA- Northwest Energy Efficiency Alliance  
Nidec Drives  
Revalize Software  
Smith & Loveless, Inc.  
TACO, Inc.  
Waukesha Foundry  
Xylem Inc.

### Committee Alternate

Jeff Bergman  
Howard Dewes  
Algernon Jones  
Randy Stevens  
Mike Pasche

### Company

ABB Motion  
ABB Motion  
ABB Motion  
ABB Motion  
Pentair

## 60.7 Training Development Playbook Process and Best Practices

### 60.7.1 Introduction

The Hydraulic Institute (HI) and Pump System Matter (PSM) is committed to supporting and advancing the pump manufacturing industry by becoming the world's resource for pumping solutions and advancements to the industry workforce. PSM achieves this by addressing pump systems, developing standards, expanding knowledge and resources, educating the marketplace, and advocating for the industry.

The Training Development Playbook Process and Best Practices (referred to as the Playbook) is written to guide anyone involved in the development of training content (webinar/courses/whitepaper etc.). This is prepared by prepared by the Educational Steering Committee (ESC) with support from the HI staff. This document is available online to ensure expectations are communicated and consistent between volunteers developing education material.

The Playbook is intended for volunteers and HI Staff to use as a reference as needed throughout the development process. To that end, the Playbook provides an overview of training levels, audiences, categories, hierarchy, and guidance for various training components. Each section of the Playbook is numbered for ease of reference. Please refer to the table of contents for a detailed list of topics covered in the Playbook.

### 60.7.2 Purpose

Develop the best training practices for HI and PSM.

### 60.7.3 Scope

All training materials developed or deployed by HI and PSM.

### 60.7.4 Deliverable and Maintenance

Best practices will be defined within this publication. The ESC will conduct a review of this document annually to ensure best practices and methods are applied.

### 60.7.5 Training Levels

The ESC has determined that the training content to be developed will be organized into different training levels: introductory, basic, intermediate, and advanced. The figure below illustrates the learning path of PSM.

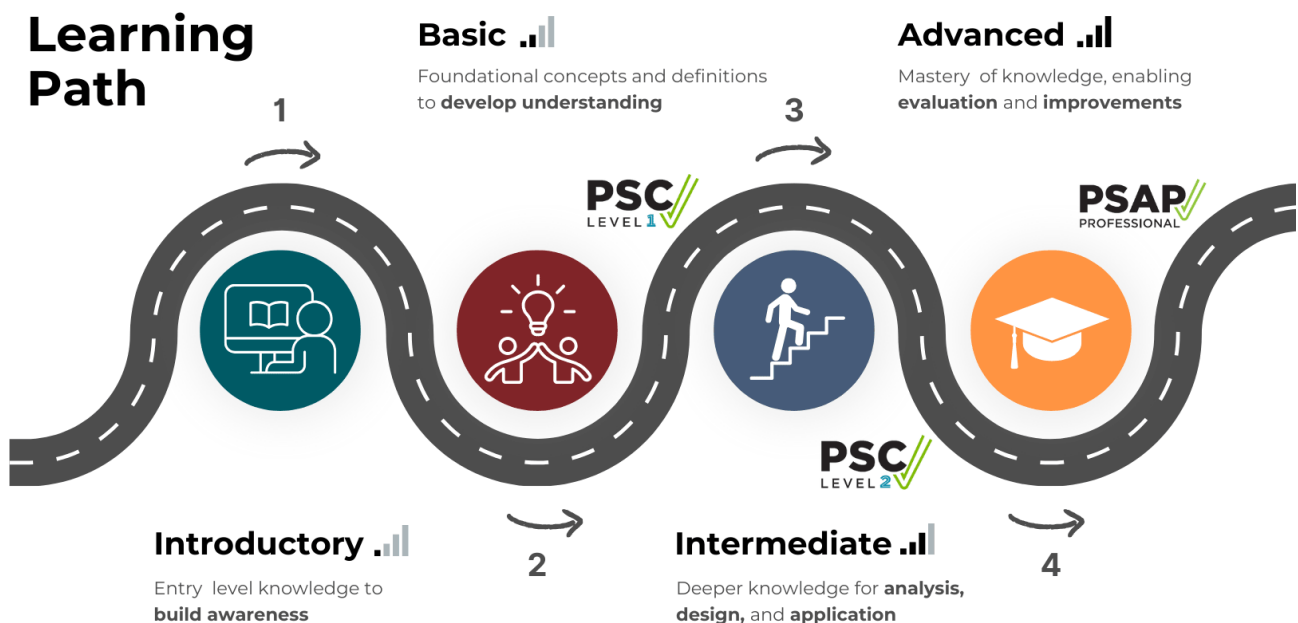


Figure 60.7.5: The Learning Path of PSM

#### 60.7.5.1 Introductory Learning Level

This level of training is designed for individuals to provide awareness and an overview of the topic. The content is informative and aims to familiarize participants with key concepts, terminology and resources.

**60.7.5.2 Basic Learning Level**

This level of training is designed for individuals who are new to the subject matter. It covers basic concepts, skills, and practices. Participants acquire a foundational understanding of the topic and develop basic competencies.

**60.7.5.3 Intermediate Learning Level**

This level of training is designed for individuals who have some experience and knowledge in the subject matter. It builds upon the foundational concepts and expands the breadth and depth of understanding. Participants develop more advanced skills and competencies.

**60.7.5.4 Advanced Learning Level**

This level of training is designed for individuals with a strong foundational knowledge and experience who seek to enhance their broad skills and knowledge. Advance training delves into complex concepts, analysis, design, optimization, and problem solving. Participants refine their expertise, broaden their skill set, and deepen their understanding, achieving a higher level of proficiency without necessarily specializing in a specific area.

**60.7.6 Training Audiences**

Training audience analysis is critical for the success of any training program to be effective. The process of determining the specific attributes of a group being trained, as well as potential barriers to their success, is called audience analysis. The ESC has determined that the training audience level for possible different training levels include the following:

- Engineers
- Assessors and Inspectors
- End-users and Customers
- Sales and Marketing Professionals
- Purchasing and Procurement Professionals
- Regulatory and Compliance Professionals
- Operators and Maintenance Personnel
- Executives and Management

The description for each audience is noted in the following sub-sections. This information is used to decide what training methods will be most effective.

**60.7.6.1 Engineers**

This group includes design engineers, project engineers, and other technical professionals who are responsible for the design and development of pumping systems. Their training needs may include topics such as pump selection, system design, fluid mechanics, and engineering calculations.

**60.7.6.2 Assessors and Inspectors**

This group includes professionals who are responsible for inspecting and assessing pumping systems for compliance with industry standards, regulations, and best practices. Their training needs may include topics such as inspection procedures, quality control, and documentation requirements.

**60.7.6.3 End-users and Customers**

This group includes the end-users of pumping systems, as well as the customers who purchase and use pumping products and services. Their training needs may include topics such as product usage, system optimization, and customer service.

**60.7.6.4 Sales and Marketing Professionals**

This group includes sales representatives, product managers, and other professionals who are responsible for selling and promoting pumping products and services. Their training needs may include topics such as product knowledge, sales techniques, customer relationship management, and market analysis.

**60.7.6.5 Purchasing and Procurement Professionals**

This group includes professionals who are responsible for purchasing and procurement of pumping equipment and related materials. Their training needs may include topics such as vendor management, procurement procedures, and contract negotiation.



**60.7.6.6 Regulatory and Compliance Professionals**

This group includes professionals who are responsible for ensuring that pumping systems comply with relevant regulations and standards. Their training needs may include topics such as regulatory compliance, quality control, and documentation requirements.

**60.7.6.7 Operators and Maintenance Personnel**

This group includes operators, mechanics, and other personnel who are responsible for operating, maintaining, and repairing pumping systems. Their training needs may include topics such as equipment operation, maintenance procedures, troubleshooting, and safety.

**60.7.6.8 Executives and Management**

This group includes senior executives and managers who are responsible for setting the strategic direction of the organization and managing its operations. Their training needs may include topics such as financial management, leadership, and organizational development.

**60.7.7 Categories for Course Content Development**

This section contains the broadly distributed categories for the development of webinars and e-learning curriculum.

- **Introduction to Pumps**
  - Basic Theory
  - Basic Applications
- **Pump Performance Curves and Power Consumption**
  - Curves
  - Horsepower
- **Pump Systems**
  - NPSH
  - System Curves
  - Friction Loss
- **Rotodynamic Pump Designs and Types**
  - Open vs Closed Line Shafts
  - Shaft Stretch
  - Bearing Life
- **Positive Displacement Pump Designs and Types**
  - PD Curves
  - Pump Slip
  - Relief Valves
- **Pump Components and Accessories**
  - Power Frames
  - Bearings & Seals
  - Couplings
- **Drivers and Drives**
  - Motors
  - Engines
  - VFD
- **System Design Considerations**
  - Applications
  - Submergence
  - Codes & Regulations
- **Varying the Pump Operating Point**
  - Parallel Pumping
  - Series Pumping
- **Pump Selection, Specification, and Application Engineering**
  - Application Considerations
  - Liquid Characteristics
  - ISO & Other Standards
- **Testing**
  - Performance Tests
  - Hydrostatic Tests
  - Vibration Tests

- **Pump Installation, Commissioning, and Start-up**
  - OSHA Requirements
  - Alignments
  - Discharge Piping
- **Maintenance**
  - Seals & Packing
  - Routine Schedules
  - Inspections
- **Troubleshooting**
  - Waterhammer
  - Bearing Failures
  - Noise
- **Pump System Optimization and Analysis**
  - Optimization
  - Assessments
  - Payback
- **Markets and Applications**

### 60.7.8 Training Hierarchy

As guided by the ESC, the training content must be developed based on the following various formats of technical documents either developed by HI or strictly technical subjects. Figure 60.7.8 illustrates the training hierarchy at PSM.



**Figure 60.7.8: The Training Hierarchy at PSM**

#### 60.7.8.1 Standards / Technical Training

Technical training offers participants industry-standard-based knowledge and skills, designed to significantly enhance their proficiency in a specific subject. With a strong emphasis on existing standards and leveraging the expertise of HI membership, this training category ensures participants receive the latest and most relevant information and practices. Usually tailored to an intermediate or higher training level, Technical Training delves deeper into the intricacies of the subject matter, equipping participants with advanced techniques and specialized insights. By combining the power of established industry standards and the collective expertise of HI members, Technical Training empowers participants to excel in their respective fields and stay at the forefront of their industries.

These topics are selected and approved by TASC and the ESC.

**60.7.8.2 General Education**

General education encompasses a comprehensive range of topics essential to a well-rounded understanding and skill set. This category of training covers a broad spectrum of subjects, including but not limited to pump types, selection criteria, system design, performance analysis, preventive maintenance, and common pump issues. Drawing from both industry standards and established industry knowledge.

General education provides participants with a solid foundation in fundamental concepts and practices. The training is thoughtfully designed at various levels to cater to the specific needs and knowledge levels of participants, ensuring that it remains accessible and valuable to learners across different stages of their professional development. Whether participants are new to the pump industry or seeking to expand their expertise, general education equips them with the necessary knowledge and skills to navigate the intricacies of pump systems effectively.

These topics are selected and approved by the ESC and PSM leadership.

**60.7.8.3 Guidebook Training**

This training category focuses on providing education to all audience types, explaining a guidebook. The aim is to familiarize participants with the content, principles, and requirements outlined in the guidebook. Through this training, participants gain a foundational understanding of the guidebook and its application in relevant industries or fields. The content is developed by a dedicated standard committee responsible for ensuring accuracy and clarity in conveying the information to a diverse audience. These topics are selected and approved by the Guidebook Committee, TASC, and the ESC.

**60.7.9 Proposal for a New Training**

The ESC reviews and approves any submitted training content. A standard guideline is set up by the committee which must be followed by anyone interested in submitting a training request. Any new training request must be submitted in the format guided by the ESC. Please reach out to [training@pumps.org](mailto:training@pumps.org) for access to the training submission form.

Table 60.7.9 provides a summary for a training proposal.

Table 60.7.9: Summary of Training Proposal Content

| Training Type      | Course Title | Training package content                                                        | Training Level                       | Training Category                    | Training Domain                      | Target Audience                      | Course Overview | Course Outline      | Course Abstract                                          | Learning Objectives | Duration | Instructor's Bio | PDH/CEU  | Free or Paid Training | Quiz Questions | Seed /Poll Questions |
|--------------------|--------------|---------------------------------------------------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|-----------------|---------------------|----------------------------------------------------------|---------------------|----------|------------------|----------|-----------------------|----------------|----------------------|
| Live/ Virtual ILT  | Required     | *HI PPT Template<br>*Visual Aides<br>*Physical Aides<br>*Textbooks<br>*Handouts | Required from HI Best Practices List | Required from HI Best Practices List | Required from HI Best Practices List | Required from HI Best Practices List | Required        | Full Outline        | For Courses longer than 4 hours or with PDH Requirements | Required            | Required | Required         | Required | Required              | Required       | Required             |
| E-Learning         | Required     | *SCORM/ Tin Can<br>*Quiz or Test info                                           | Required from HI Best Practices List | Required from HI Best Practices List | Required from HI Best Practices List | Required from HI Best Practices List | Required        | Full Outline        | For Courses longer than 4 hours or with PDH Requirements | Required            | Required | Required         | Required | Required              | Required       | Required             |
| Webinar (Live)     | Required     | *HI PPT Template<br>*Recorded MP4<br>*Quiz or Poll Questions                    | Required from HI Best Practices List | Required from HI Best Practices List | Required from HI Best Practices List | Required from HI Best Practices List | Required        | Abbreviated Outline | Optional                                                 | Required            | Required | Required         | Required | Required              | Required       | Required             |
| Webinar (Recorded) | Required     | *HI PPT Template<br>*Recorded MP4<br>*Quiz or Poll Questions                    | Required from HI Best Practices List | Required from HI Best Practices List | Required from HI Best Practices List | Required from HI Best Practices List | Required        | Abbreviated Outline | Optional                                                 | Required            | Required | Required         | Required | Required              | Required       | Required             |
| Video Shorts       | Required     | *MP4                                                                            | Required from HI Best Practices List | Required from HI Best Practices List | Required from HI Best Practices List | Required from HI Best Practices List | Required        | Not Required        | Not Required                                             | Required            | Required | Required         | Required | Required              | Required       | Required             |

## 60.7.10 Guidance for Various Training Components

### 60.7.10.1 Training Types

The development of any training content must follow the ESC approved guidelines. Below are examples for the various formats of the training.

#### 10.7.10.1.1 Instructor-led Training (In-Person or Virtual)

Instructor-led training involves a trainer or facilitator leading a session in-person or virtually. This can include lectures, demonstrations, and hands-on activities. It provides comprehensive knowledge on multiple topics.

#### 60.7.10.1.2 E-learning

E-learning involves delivering training content through an online platform, such as a learning management system (LMS). E-learning can include self-paced modules, interactive simulations, and quizzes.

#### 60.7.10.1.3 Webinars

Webinars are online sessions that can be delivered live or recorded. They provide valuable content and insights on a specific topic through presentations or lectures in a short period of time varying between 60-90 minutes duration.

Live webinars often offer opportunities for learners to engage in discussions and ask questions, while recorded webinars provide flexible access to the content without live interactive features.

#### 60.7.10.1.4 Short Videos or Modules

Short videos, also known as microlearning videos or bite-sized videos, are typically 1 to 5 minutes in length and deliver small, targeted pieces of information that can be quickly and easily consumed by learners.

Short videos can be delivered through a variety of platforms, including YouTube and TikTok, and are well-suited for mobile learning and just-in-time training.

### 60.7.10.2 Guidance on Writing a Title

The ESC recommends the use of a general topic paired with a descriptor. Titles should ideally be no longer than 50 characters. Title should be written as: Topic: Descriptor

#### *Examples:*

- *Energy-Efficient Pumping Solutions: Reducing Costs and Environmental Impact*
- *Pump System Troubleshooting for Facilities Managers: Enhancing Efficiency and Minimizing Downtime*
- *Centrifugal Pump Selection for Beginners*

Before submitting the title, please review the title to ensure it is not used for other (existing) training courses. The titles should always be brand neutral. Please follow the following recommendations to create the course training titles.

#### 60.7.10.2.1 Including Learning Outcomes in the Title

Include the key benefits or outcome that participants can expected to gain from taking the training. This helps potential participants understand the value and relevance of the course and how it can positively impact their professional development or solve a specific problem they may have.

*Example: Energy-Efficient Pumping Solutions: Reducing Costs and Environmental Impact*

#### 60.7.10.2.2 Including Target Audience in the Title

Tailor the course title to resonate with the target audience you want to attract. Think about specific job roles, industries, or skill levels that the training is intended for. Incorporate language or terminology that appeals to that audience and speaks directly to their needs or interests.

*Example: Pump System Troubleshooting for Facilities Managers: Enhancing Efficiency and Minimizing Downtime*

### 60.7.10.2.3 Being Detailed and Concise

The course title should clearly convey what the training is about and the specific topic or subject matter it covers. Avoid using vague or ambiguous language that may confuse potential participants. Use keyword ad terms that accurately represent the content and learning outcomes of the course.

*Example: Centrifugal Pump Selection for Beginners*

### 60.7.10.3 Guidance on Writing a Training Overview

ESC recommends a short and informative description of the training or educational content. Overviews should be within 50 words to ensure visibility on social media or abbreviated LMS positions. Please keep all course overviews brand-neutral.

*Example:*

*Optimizing Pump Efficiency*

*"In today's ever-evolving industrial landscape, pump efficiency isn't just a goal – it's a necessity. Discover how our pump training empowers participants with the expertise to fine-tune pump systems for peak performance. Unveil the secrets behind energy-efficient pumping, hydraulic analysis, and proactive maintenance to unleash operational excellence."*

**Please follow the following recommendations to create the course overview.**

1. **Concise Clarity:** Craft a clear and concise overview that conveys the essence of the pump training. Clearly state the training's purpose, focusing on the specific pump-related knowledge and skills participants will acquire. Use language that is accessible to both industry professionals and those new to pump systems.
2. **Highlight Benefits and Objectives:** Showcase the benefits that participants will gain from the pump training. Illustrate how the training will enhance their understanding of pump and pump systems, improve maintenance and troubleshooting skills, and contribute to more efficient operations. Outline the key learning objectives, ensuring participants know what they will accomplish by completing the training.
3. **Engage and Intrigue:** Begin the overview with an engaging hook that sparks curiosity about pump systems. Consider starting with a compelling industry statistic, a relatable pump-related challenge, or a question that prompts readers to think about the importance of efficient pump operations. This introduction should encourage potential participants to delve deeper into the details of the training.

### 60.7.10.4 Guidance on Developing a Full Training Outline

HI recommends developing a detailed course outline, highlighting the main topics and subtopics covered in the training. This is designed to be an overview of the concepts covered. The abstract will provide additional details. The format for the outline should follow the course hierarchy.

*Example:*

- *Course Title*
- *Section 1: Introduction to Pump Efficiency*
  - *Module 1.1: Learning Objectives*
  - *Module 1.2: Importance of Pump Efficiency*
- *Section 2: Pump Efficiency Applications*
  - *Module 2.1: General Applications*
  - *Module 2.2: How to apply*
- *Section 3: Etc.*

**Please follow the following recommendations to create the training overview.**

1. **Start with Learning Objectives:** Clearly define the specific skills, knowledge, or competencies participants should gain by the end of the training. Learning objectives provide a roadmap for structuring your content.
2. **Organize by Modules or Topics:** Divide your training into logical sections or modules. Each module should cover a specific aspect of the topic and contribute to achieving the learning objectives.
3. **Sequential Flow:** Arrange modules in a logical sequence, ensuring that each build upon the previous one. This creates a coherent and progressive learning experience.

4. **Content Breakdown:** For each module, outline the key concepts, subtopics, or skills that will be covered. This breakdown helps you ensure comprehensive coverage of the subject.
5. **Engagement Elements:** Incorporate interactive elements like activities, case studies, quizzes, or discussions at appropriate points to engage participants and reinforce learning.
6. **Time Allocation:** Estimate the time needed for each module or activity. This helps in structuring the training within a specific timeframe.
7. **Assessment and Evaluation:** Plan how you will assess participants' understanding and progress throughout the training. Include quizzes, assignments, or other assessment methods.
8. **Visual Aids and Resources:** Identify any visuals, charts, diagrams, or external resources that will enhance the learning experience.
9. **Flexibility:** Allow for flexibility in case some topics require more time or participants need additional clarification.

#### 60.7.10.5 Guidance on Writing an Abstract

ESC recommends a comprehensive abstract to help potential students determine the relevance of the training. This should be longer and more descriptive than the overview and outline.

*Example:*

*Unleash the potential of pump systems with our dynamic training on Optimizing Pump Efficiency. Dive deep into cutting-edge strategies and techniques to maximize pump performance, reduce energy consumption, and enhance overall system efficiency.*

- *Master Efficiency Enhancement:* Learn advanced methods for optimizing pump operations, including affinity laws, speed control, and impeller trimming, to achieve substantial energy savings.
- *Holistic Approach to Maintenance:* Gain insights into preventive maintenance practices, real-time monitoring, and data-driven analysis to ensure sustained efficiency and minimize downtime.
- *Fluid Dynamics Mastery:* Explore the intricacies of fluid behavior, NPSH considerations, and viscosity effects, enabling precise pump system design and operation.
- *Real-world Case Studies:* Immerse yourself in real-world scenarios where efficiency improvements led to remarkable cost savings and operational excellence.

*This training is designed for engineers, maintenance professionals, and industry enthusiasts seeking to unlock the full potential of pump systems. Join us to revolutionize pump efficiency, reduce operational costs, and elevate your expertise to new heights. Secure your spot now and embark on a journey toward pump system excellence.*

**Please follow the following recommendations to create the training abstract.**

1. **Focus on Value Proposition:** Clearly communicate the unique value and benefits participants will gain from the pump training. Highlight how the training addresses specific challenges, enhances skills, or contributes to professional growth. Make sure the reader understands why this training is essential for them.
2. **Highlight Key Content:** Summarize the main topics, techniques, or strategies that the pump training will cover. Give a glimpse into the knowledge participants will acquire and the practical skills they will develop. This demonstrates the depth and relevance of the training.
3. **Engage with Language:** Use engaging language that sparks curiosity and interest. Begin with a intriguing statement that grabs the reader's attention. Craft the abstract in a way that generates excitement and conveys the potential impact of the training.

#### 60.7.10.6 Guidance on Writing Learning Outcomes

The HI and the ESC recommends each training have 2-5 clearly defined learning objectives. Objectives should be created using verbs like those found in Bloom's Taxonomy. [Click here](#) for more information.



*Example:*

- *Describe Pump Affinity Laws and Their Application:* After completing the training, participants will be able to explain the principles of pump affinity laws and apply them to predict the effects of speed changes on pump performance.
- *Implement Impeller Trimming Techniques:* By the end of the training, participants will demonstrate the ability to analyze pump performance curves, determine the appropriate impeller diameter, and perform impeller trimming calculations to optimize pump efficiency.
- *Identify and Mitigate Factors Leading to Cavitation:* Upon completion of the training, participants will be able to recognize the symptoms of cavitation, calculate Net Positive Suction Head (NPSH), and implement strategies to mitigate cavitation risks and enhance pump reliability.
- *Utilize Data-Driven Maintenance for Pump Efficiency:* After the training, participants will apply data analysis techniques to monitor pump performance, identify efficiency degradation, and proactively plan maintenance activities to ensure sustained pump efficiency.
- *Design Energy-Efficient Pump Systems:* By the end of the program, participants will be proficient in designing pump systems that minimize energy consumption, incorporating variable frequency drives (VFDs), and selecting components for optimal system efficiency.

**Please follow the following recommendations to create the training learning outcome.**

1. **Be Specific and Measurable:** Clearly state what participants will be able to do or demonstrate after completing the training. Use action verbs that are observable and measurable, allowing you to assess participants' achievement of the objective.
2. **Focus on Key Skills and Knowledge:** Identify the most important skills, knowledge, or competencies that participants should acquire. Learning objectives should reflect the essential takeaways from the training.
3. **Align with Training Content:** Ensure that each learning objective corresponds directly to the training content. The objectives should guide the design of activities, assessments, and instructional materials.

#### **60.7.10.7 Typical Duration for Training**

Training is a specific and practical learning approach aimed at acquiring specific skills or competencies required for a particular job or task. It is often provided in a more hands-on and experiential manner, focusing on practical application. Training helps individuals apply that knowledge in real-world scenarios. Training aims to enhance performance, improve efficiency, and ensure individuals possess the necessary skills to carry out their roles effectively.

Training can be delivered through various methods, including workshops, seminars, on-the-job training, and online courses. It is often provided by subject matter experts or experienced professionals who possess practical knowledge and expertise in the relevant field. Training programs can range from short-term sessions to more extensive programs, depending on the complexity of the skills being taught various methods by subject matter experts.

- Use minutes up to 2 to 120 minutes (2 Hours) for instruction of short video module or webinars.
- Use Hours for 3 to 6 hours of instruction for instruction of e-learning training curriculum.
- Use days when training is 7 to 8 hours for instruction e-learning training course curriculum.
- Use decimals when training is longer than 7 to 8 hours and includes an overnight for instruction Instructor-led training (In-Person or Virtual).

*Examples:*

*2 Minutes – Short video*

*30 Minutes/60 minutes/ 90 minutes/ 120 minutes – Short video module or webinar*

*4 Hours/ 6 Hours – e-learning training curriculum*

*1 Day/ 2.5 Days/ 4 days - Instructor-led training (In-Person or Virtual)*



#### 60.7.10.8 Guidance on Writing an Instructor Bio

ESC recommends adding an Instructor's Bio help potential students determine the relevance and interest towards the training. The instructor's bio should be presented with the following detail information:

- **Name:** Begin with Instructor's full name.
- **Title:** Mention your current job title or position, especially if it's relevant to the subject you'll be teaching.
- **Education:** List your highest level of education, including degrees earned, the institutions attended, and graduation dates. Highlight any degrees or certifications directly related to the subject you're teaching.
- **Professional Experience:** Describe your relevant work experience, including previous roles, employers, and the duration of your employment. Highlight positions that demonstrate your expertise in the subject matter.
- **Areas of Expertise:** Provide a list of the specific topics or subjects you are qualified to teach or have expertise in. This helps students understand your specialization.
- **Please include a high-resolution (300 ppi) photo.**

*Example:*

*Dr. Noname Johnson, P.E., an expert Pump System Efficiency Specialist, holds a Ph.D. in Mechanical Engineering from MIT and is a licensed Professional Engineer in California. With over 15 years of experience, she excels in optimizing pump systems across diverse industries. Her advanced knowledge in fluid dynamics and thermodynamics, coupled with certifications in Pump System Optimization from HI, has led to significant energy savings and cost reductions for clients. Dr. Johnson specializes in pump system design, energy-efficient pump selection, optimization, maintenance strategies, and cost-effective efficiency solutions. Contact her at [noname.johnson@email.com](mailto:noname.johnson@email.com) to enhance your pump systems for maximum efficiency and savings.*

#### 60.7.10.9 Guidance on Writing Quizzes & Polling Questions

The ESC recommends adding quiz and poll questions to help the students determine their level of understanding the training. While creating quizzes and polls for a training playbook, it is crucial to tailor their complexity and length to the specific training content and objectives. Ensure that the quizzes and polls are "right sized" to match the depth and breadth of the training. Short, focused quizzes work well for quick knowledge checks, while more comprehensive assessments are suitable for in-depth training modules. By aligning the quiz or poll size with your training goals, you can maintain learner engagement and effectively measure their progress.

Consider the following when writing quizzes and following questions:

- **Clearly Define Learning Objectives:** Before crafting questions, establish clear learning objectives for your training session. Your questions should directly align with these objectives to ensure that you're assessing the desired knowledge or skills. Avoid ambiguity and make sure each question has a specific purpose.
- **Use a Variety of Question Types:** Incorporate different question types to engage adult learners and assess their knowledge from various angles. Common question types include multiple-choice, true/false, matching, and short answer. Mix these formats to keep the quiz or poll interesting and to cater to different learning styles.
- **Keep Questions Concise and Clear:** Write questions that are concise and free from jargon or technical language that may confuse participants. Ensure that each question is easily understandable without the need for additional context. Avoid double negatives or overly complex sentence structures.
- **Avoid Tricky or Ambiguous Language:** Adult learners typically prefer questions that are straightforward and fair. Avoid trick questions or vague wording that can lead to frustration. Ensure that there is only one correct answer per question, and make sure it's unequivocally correct.
- **Provide Constructive Feedback:** If applicable, offer feedback after each question, explaining why a particular answer is correct or incorrect. This not only helps learners understand their mistakes but also enhances the learning experience. Constructive feedback is particularly important in adult education as it promotes continuous improvement.
- **Pilot Test Your Questions** - Before using quiz or poll questions in a training session, consider pilot testing them with a small group of participants to identify any issues, ambiguities, or misunderstandings. This allows you to refine your questions for optimal clarity and effectiveness.

