Code	Title
ASME-PV-P 01	ASME Section VIII Division 1 Design and Fabrication for Pressure Vessels
ASME ENPD 02	PROJECT MANAGEMENT FOR ENGINEERS AND TECHNICAL PROFESSIONAL
ASME ENPD 03	Reability Centered Maintenance-RCM
ASME PV-P 02	ASME SECTION VIII DIVISION 2
ASME PV-P 04	ASME Section IX Welding and Brazing
ASME PV-P 05	Non-destructive Testing
ASME PV-P 06	B 31.1 POWER PIPING DESIGN AND FABRICATION
ASME ENPD 06	Inspection Based Risk (IBR)
ASME PV-P 03	REPAIR AND ALTERATION OF PRESSURE VESSELS
ASME PV-P 07	ASME B 31.3Process Piping
ASME PV-P 08	B 31.8 GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEMS
ASME ENPD 01	Selection and Operation of Pump for Petroleum Faclities2

ASMEPV-P 01 ASME Section VIII Division 1 Design and Fabrication for Pressure Vessels

Based on the rules for pressure vessel design and construction, this course is a comprehensive introduction to the requirements of Section VIII, Division 1 including background, organization, design, materials, fabrication, inspection, testing and documentation of pressure vessels. The more commonly used subsections and paragraphs will be covered, and a discussion of individual problems or situations will be included. This course is intended for beginners, as well as experienced vessel designers who would like to update their knowledge of the Code.

Upon Completion of This Course you will know:

- **The background of the Code rules**
- **How to apply the Code rules to more common design and fabrication situations**
- **How to perform calculations for some of the loadings and situations not addresses by the Code**
- **How to prepare design specifications, design reports, Data Reports, and other documentation**

Who Should Attend:

Those involved with the purchase, design, fabrication, or inspection of pressure vessels. Some technical background will be helpful, but attendees are not required to have an Engineering degree or previous work experience in the subject matter.

Special Features:

An overview of code organization, editions and addenda will be given, and participants will learn how to prepare and submit an inquiry to the Code Committee for Code Interpretation, Code Cases or Code revision It is suggested (but not required) that you bring the latest Edition of the ASME Code Section VIII, Division 1, Pressure Vessels.

Course Outline:

- **Code rules, scope and jurisdiction**
- **General requirements related to materials and testing**
- **Material toughness and impact testing requirements**
- **Joint categories and joint efficiencies**
- **General requirements related to stamping, reports, testing, PWHT, tolerances, and NDE's**
- **Welding requirements**
- **Committees, operation and voting procedures**
- **Editions, addenda and interpretations**
- **Design Requirements**
- **Design loadings and allowable stresses**
- **Design criteria and strength theory for Division 1**
- **Formulas for internal pressure and tensile loading**
- **Procedures for external pressure (vacuum) and compressive loads Openings and reinforcement**

ASMEENPD 02 **PROJECT MANAGEMENT FOR ENGINEERS AND TECHNICAL PROFESSIONALS**

This course takes into account the business environment engineers face on a daily basis when confronting projects of varying applications. Attendees will learn how project management will improve outcomes while allowing them to manage their numerous other responsibilities. This highly interactive, five-day course will utilize projects attendees present in order to meet all requirements set forth in a Learning Action Plan. Participants are guided through each step of the project management process from project definition to resource management to contingency planning to result tracking and evaluation.

Upon completion of this course you will be able to:

- **Recognize the Project Management Skills you possess and those you need to enhance**
- **Utilize a step-by-step approach to plan, implement, and evaluate each project**
- **Assess other people abilities in their own roles in respective projects**
- **Acquire strategies to enable others with enhanced communication skills**
- **Deal with issues such as lack of resources and office politics**

Special Requirements:

- **Each attendee is encouraged to bring with them a current project outline so that a step-by-step plan can be created in order to meet the project goals.**

Course Outline:

- **Course Highlights**
- **Utilize resource manuals**
- **Work on practice case studies**
- **Develop and complete planning pages**
- **Complete problem-solving activities**

ASMEENPD 03 **Reliability Centered Maintenance-RCM**

This five-day course provides an introduction to the principles of RCM. RCM is a proven systematic approach for defining maintenance tasks for engineering systems. It has been successfully applied in several industries most notably in the aviation, chemical, and petroleum, manufacturing and electric utility industries.

Upon Completion of this course you will know :

- **What are the intended functions of the system?**
- **What functional failures can occur in the system?**
- **What component failures can result in functional failures?**
- **What component failure modes can results in component failures of interest?**
- **What maintenance tasks are effective at predicting or preventing key component failure modes?**

Course Outline;

- **Reliability and Availability - basic indicators**
- **Improvement of the RCM Process**
- **Overview of traditional maintenance programs**
- **Overview of world-class maintenance programs**
- **RCM Introduction**
- **RCM Teamwork**
- **RCM Facilitator**
- **Overview of RCM implementation process**
- **System Description & Functional Block Diagram**
- **FMEA - Failure Modes and Effects Analysis**
- **System Functions & Functional Failures**
- **Failures Modes**
- **Effects Analysis**
- **Hidden Failures**
- **RCM Logic tree/Select the maintenance tasks and perform task comparison**

ASMEPV-P 02 ASME SECTION VIII DIVISION 2

Attendees should have familiarity with Section VIII code as this is an advanced course involving this course. Do you understand the complex rules of the ASME Section VIII, Division 2 and can you effectively apply them? Are you taking full advantage of the cost savings this Division offers? Do you know about the latest ASME Code Committee actions? Are you aware of major revisions being prepared for Division 2? If you answer no to these questions then you need to take this intensive seminar. In today increasingly competitive environment, manufacturers and designers in the United States need to produce cost-effective, state-of-the-art pressure vessels. The lower design margin of the ASME Division 2 Code vs. Division 1 makes it more competitive with other international codes. Using case studies learn from an ASME expert on how to apply the design and analysis rules.

Who Should Attend:

- **Pressure vessel designers, fabricators, and users**
- **Individuals performing stress analysis of pressure equipment, wanting to familiarize themselves with the stress analysis and fatigue analysis methods of this Division.**
- **Practical experience in structural design related to pressure equipment and familiarity with the ASME Code will be helpful, but are not required.**

Upon completion of this course you will:

- **Be able to design a vessel to this Code**
- **Perform various types of analyses and evaluate the analysis results**
- **Have a complete understanding of the Division 2, including general requirements, materials, fabrication, NDE, PWHT, testing, documentation and stamping**

Course Outline

- **Introduction to the ASME B&PV Code and history**
- **Introduction to Section VIII, Div. 2 and general requirements**
- **Introduction to fracture mechanics and thermal analysis**
- **Material requirements and how to select materials**
- **Fracture toughness rules**
- **Fabrication requirements**
- **NDE requirements**
- **PWHT requirements**
- **Tolerance requirements**
- **Testing**
- **Documentation and stamping**
- **Design for internal pressure**
- **Design for external pressure**
- **Design of penetrations**
- **Design of flanges**
- **Appendix 4 stress analysis**
- **Appendix 5 fatigue analysis**
- **Classification of stresses**
- **Example problems**
- **A preview of the major re-write of Division 2**

ASMEPV-P 04 **ASME Section IX Welding and Brazing**

This course covers the requirements of ASME Section IX by reviewing basic welding metallurgy.

Who Should Attend:

- **Welding engineers**
- **Quality assurance personnel**
- **Auditors**
- **testing laboratory personnel**
- **maintenance personnel and jurisdictional inspection personnel**
- **Anyone involved in qualifying welders, brazers and operators; or others involved in writing and qualifying welding and brazing procedure specifications**
- **Those responsible for reviewing supplier procedures, auditing or reviewing in-house procedures and qualifications**
- **Professionals who estimate jobs where compliance of ASME Section IX is mandatory**

Upon Completion of this course you will know:

- **how to achieve economical compliance with ASME Section IX requirements**
- **how to interpret, understand and comply with ASME Section IX**
- **how to review welding processes /variables and basic welding metallurgy**
- **how to review the recent changes to Section IX**

Special Features:

- **Emphasis is placed on writing and qualifying welding procedures that follow Section IX**
- **Requirements for welders, brazers and operators are closely examined**
- **Time is provided to address specific problems and concerns of the class**

Course Outline

- **Historical perspective; Welding and code development ;Relationship of Section IX to other codes**
- **Review of welding processes and common variables: fuel gas welding; SMAW, GTAW; GMAW, SAW; PAW; ESW; EGW; EBW; SW; FW; RW; variables for common processes will be examined in detail**
- **Basic welding metallurgy; P-numbers, S-numbers and non-code metals; steel metallurgy; harden ability; preheat and post weld heat treatment Filler metal specifications. F-numbers; A-numbers**
- **SFA specifications; non-SFA filler metals**
- **Writing the WPS; meeting code requirements; addressing customer requirements; providing direction to the welder; sources of information for preparing intelligent and meaningful welding procedure specifications**
- **Selecting and preparing the test coupon ;obtaining maximum cost-effectiveness from test coupons; preparation and welding of the test coupon; recording both necessary and worthwhile data; demonstrating code compliance**
- **Practical session: writing the welding procedure specification**
- **Use of Section IX form; other formats; procedure qualification record forms; revisions to records and procedures; take-home test Welder and welding operator qualifications**

- **selection of test coupons to minimize testing costs and simplify record keeping; conducting performance test; organizational responsibility and ownership of test records; testing of coupons and recording of test data; maintaining continuity of qualification**
- **Special considerations for notch toughness; how welding influences toughness; measuring and recording heat input data; translating heat input data into useful directions for a welder; typical construction code requirements**
- **Brazing; brazing processes and variables; differences between the QW (welding) and QB (brazing) sections; preparation of the brazing procedure specification; qualification of the brazing procedure; types of tests; qualification of brazers and brazing ope**

ASMEPV-P 05 Non-Destructive Testing

his new course will provide the attendee with an overall understanding of the basic principles and applications of the major NDE methods as they relate to ASME Code Sections V, VIII, and XI. The presentations will be supplemented with the demonstrations of actual basic NDE equipment and materials.

Special Features

- Receive a copy of the instructor book, The Handbook of Non-Destructive Evaluation

Who Should Attend

- Management, supervisors, engineers, maintenance personnel and others who desire a general knowledge of NDE.

Course Outline:

- Introduction; Program objectives ;what is NDE?
- Visual testing ; Principles, procedures, evaluation, reporting, ASME Code requirements, demonstration
- Penetrate testing ; Principles, procedures, evaluation, reporting, ASME Code requirements, demonstration
- Magnetic particle testing ; Principles, procedures, evaluation, reporting, ASME Code requirements, demonstration
- Radiographic testing ; Principles, procedures, evaluation, reporting, ASME Code requirements, demonstration
- Ultrasonic testing ; Principles, procedures, evaluation, reporting, ASME Code requirements, demonstration
- Eddy current testing ; Principles, procedures, evaluation, reporting, ASME Code requirements, demonstration

ASMEPV-P 06 B 31.1 POWER PIPING DESIGN AND FABRICATION

Worldwide competitiveness is forcing the need to construct more effective piping systems, possible only if existing piping codes and standards are understood and the intentions realized. This intensive five-day course brings you up to the minute on current Power Piping Code requirements and provides insight into how these requirements have evolved and what future changes in the Code may be expected. This course explores the background, rules and trends in piping design, analysis, and fabrication vital elements of power, industrial and institutional plant construction and maintenance within the context of meeting the requirements and intent of ASME B31.1 and its appendices.

Upon completion of this course you will know:

- **Why the Code is intentionally simplified and how to deal with special and complex piping problems**
- **The principal failure modes of piping components and where to look for such failures**
- **The differences between pressure component design and structural design**
- **Layout and simplified analysis techniques**
- **How to qualify nonstandard fittings and joints**
- **How to develop stress intensification factors**
- **Common and less common welding processes, advantages and disadvantages**
- **Fabrication/examination rules and their bases**
- **How the Code may be used for operation and maintenance**

Who Should Attend:

- **Engineers entering the piping design and analysis field**
- **practicing piping engineers requiring background on Code compliance and trends in piping design, analysis and fabrication**
- **piping fabricators and suppliers wishing to understand the relationship of fabrication and manufacture to the design and construction of piping systems**
- **QA/QC personnel.**

Special Features & Requirements:

- **At a workshop on day five, attendees will apply what they have learned to piping design and construction problems. Bring a copy of the latest edition of the ASME B31.1 Power Piping Code Book and a calculator.**
- **On the last day there will be a workshop in which attendees will have an opportunity to apply what they have learned to piping design and construction problems.**

Course Outline:

- **Combinations of loads; cold spring; simplified System (external load) design: weight; occasional loads (earthquake and wind); consideration of dynamic loads; flexibility analysis; fatigue considerations; stress intensification factors and stress indices;**
- **Pipe support design: support types; loading and combinations considered; design methods; guidelines for locating supports; variable supports; lugs and attachments**
- **Special piping systems: boiler external piping; pressure relief piping, instrument piping; hazardous piping; nonmetallic piping, buried piping**

- Piping materials: permitted materials, material selection; submitting materials for code use; welding materials; impact of other codes and standards.
- Piping fabrication; welding processes; cutting processes; hot and cold bending; heat treatment; joint design; workmanship requirements
- Examination, inspection, and testing: the difference between examination and inspection; personnel certification; authorized inspection; methods of examination; accuracy of examination methods;
- leak testing methods (hydrostatic test, pneumatic test, in-service testing, alternatives)
- Operation, maintenance, modification; and corrosion control
- Introduction: piping history; code philosophy; general requirements; organization
- Piping design criteria: failure modes; stress categories-sustained (primary) stresses, cyclic (secondary) stress ranges; basis of allowable stresses acceptance criteria
- Piping design conditions; normal design loads; consideration for unusual loads; load categorization
- Component (pressure) design: determining wall thickness; joint efficiency factors and manufacturing quality factors; bends and elbows; area replacement rules for branch connections;
- System (external load) design: weight; occasional loads (earthquake and wind); consideration of dynamic loads; flexibility analysis; fatigue considerations; stress intensification factors and stress indices;
- Qualification of standard components; pressure-temperature ratings and schedule or weight designations; variations from normal operation

ASMEENPD 06 Inspection Based Risk

RBI refers to the application of risk analysis principles to manage inspection programs for plant equipment. This course shows you how to develop a RBI program at your facility. It provides you with the methods you need to perform the analyses involved and explains how to establish individual equipment inspection programs.

Who Should Attend:

Maintenance managers, engineers, and other practitioners concerned with planning and control of maintenance operations.

Objectives:

- To provide the participants with the modern concepts and techniques in RBI.
- Provide instruction on how to establish a risk-based inspection program for the critical facility.
- To develop the managerial capabilities of the participants to improve the performance of maintenance units
- To enhance the practical experience of the participants by discussing some maintenance problems.

Course Outline:

- Risk based inspection (RBI) overview
- Failure analysis
- Failure mode effect analysis (FMEA)
- Risk analysis

- Reliability Centered maintenance (RCM)
- Predictive maintenance policies
- RBI for bearing failure
- Designing equipment inspection programs
- RBI Software

ASMEPV-P 03 REPAIR AND ALTERATION OF PRESSURE VESSELS

This course is a comprehensive introduction to the requirements of various codes and standards, regarding inspection, repairs and alterations of pressure equipment, and in particular pressure vessels. The requirements of the National Board Inspection Code and the API-510 will be covered in detail. A brief introduction to API-579, Fitness for Service will also be included. Simple flaw evaluation procedures will be evaluated. The activities of ASME Post Construction Committee will be explained and documents published by this Committee will be discussed

Who Should Attend:

- Individuals from users, manufacturers, repair organizations, inspection agencies and other organizations involved with maintenance and repair of pressure equipment.
- This course is intended for beginners, as well as experienced personnel wishing to update their knowledge.

Special Features:

- Receive the latest edition of the National Board Inspection Code.
- Learn about the latest developments in the rapidly advancing field of pressure equipment inspection and repairs
- Receive an overview of the work being performed by API, ASME, and PVRC, in the related areas.

Course Outline:

- Explanation of the responsibilities of the users, manufacturers, repair organizations, regulatory agencies and authorized inspectors
- How to obtain a National Board stamp
- Detailed requirements of the NBIC
- Differences between the NBIC and API-510; Examples of repairs and alterations and the documentation requirements for each
- An introduction to API-579
- Simple Level 1 evaluation procedures for various flaws
- An introduction to the ASME Post Construction Committee
- Introduction to ASME post-construction standards
- Overview of work being performed by API, ASME, and PVRC related to post construction issues
- Examples demonstrating the application of the rules
- Open discussion of specific situations and problems brought up by the attendees
- Introduction to post construction codes and standards and the interrelation of various documents.

ASMEPV-P 07 ASME B 31.3 Process Piping

The lack of commentary, or historical perspective, regarding the B31.3 Code requirements for process piping design and construction is an obstacle to the designer, manufacturer, fabricator, supplier, erector, examiner, inspector, and owner who wants to provide a safe and economical piping system. This intensive five-day course, through the use of hundreds of examples shown and personal experiences of the instructors demonstrates how the B31.3 Code has been correctly and incorrectly applied. This seminar explains the principal intentions of the Code and why the Code is not a handbook. Attendees come away from this seminar with a clear understanding of how piping systems fail and what the Code requires the designer, manufacturer, fabricator, supplier, erector, examiner, inspector and owner to do to prevent such failures. The focus of the seminar is to enhance participants understanding and application of the B31.3 Code. Instruction is further enhanced by in-class problem solving, directly applying the rules and equations of the B31.3 Code for specific design and operating conditions to illustrate correct applications.

Who Should Attend:

- **Piping engineers and designers who need an understanding of the requirements for compliance and the trends of Code changes for piping design and analysis, fabrication, examination, and testing.**

Special Requirements:

- **Bring the latest edition of the ASME B31.3 Process Piping Codebook as well as a calculator**

Course Outline:

- **Piping code history and basic philosophy of piping design criteria**
- **Pressure design: wall thickness calculation; area replacement**
- **External loads design: flexibility; fatigue; stress intensification factors; combined loads (sustained wind, earthquake); cold spring**
- **Pipe support design: support types; assumptions; load combinations; variable supports; lugs and attachments**
- **Systems piping: pressure relief, piping; pipe and piping component limitation**
- **Materials, fabrication, examination, inspection and testing**

ASMEPV-P 08 B 31.8 GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEMS

ASME B31.8 is the most widely used Code for the design, operation, maintenance, and repair of natural gas distribution and transmission pipelines. This five-day course explains the present-day piping Code provisions, the principal intentions of the Code, and how the Code should be used. The emphasis is on transmission pipelines.

Upon completion of this course you will know:

- Causes and modes of pipeline failure
- Considerations for pipe fabrication and material specifications
- How to evaluate pipeline defects
- Pipeline repair techniques
- How code requirements address these issues
- Differences between B31.8 and US DOT gas pipeline regulations

Who Should Attend:

- Engineers
- Code compliance personnel
- Operation and maintenance personnel
- Regulatory personnel

Special Features and Requirements:

- Receive a copy of the ASME B31.8 Code

Course Outline:

- Welding procedure specifications
- Weld details
- API 1104 vs. ASME BPV
- Historical background of the Code
- How safe are pipelines?
- History and organization of B31 book sections
- B31.8 organization and intent
- B31.8 scope and philosophy
- Materials
- Pipe grade and quality
- Fracture control and arrest
- Charpy impact theory
- Pressure design and specification
- Design conditions
- Allowable stresses
- Straight pipe under internal pressure
- Location classifications
- Factors of safety
- Piping components
- Branch connections and area replacement

- **Welded joints**
- **Sustained and cyclic design of piping systems**
- **Combined stresses**
- **Fatigue**
- **Stress intensification factors**
- **Piping flexibility analysis**
- **Construction**

ASMEENPD 01 **Selection and Operation of Pump for Petroleum Faclities2**

A course for engineers and operation or maintenance supervisors who will learn how to choose the right pump for any operation or service. They will learn to perform the maintenance of pumps and conduct emergency or major inspection and repair of pumps.

Upon Completion of this course you will:

- be able to differentiate between centrifugal and positive displacement pumps
- Have learnt more about the relationship between ASME and API Codes and Standards
- Have understood characteristic curves, graphs and charts for selection and sizing pumps
- Have recognized the differences and uses of seals and packing
- Have learnt how to schedule and perform maintenance and repair

Who should attend:

- Engineers, maintenance and operation supervisors who are involved with pumps or fluid systems that need to keep in operation, must be improved or are continually changing.

Course Outline:

- Pressure profile in pipelines
- Pressure reducing stations
- Pressure losses in pipelines
- Seals and packing general characteristics
- Selection and applications
- API and CPI mechanical seals flush plans
- Pumps maintenance and troubleshooting
- Overhauls planning and schedule
- Pumps classification
- Theory and common formulas;
- Impellers size and form
- Characteristic curses for pumps; Pumping system curves
- Viscous liquids correction factors in centrifugal pumps
- System characteristics
- Energy, system head, hydraulic gradient
- Total head curves, pumping system differences
- Pressure losses, identification, calculus and correction tips
- Pumping system economics
- Developing a pumping system
- Pumping stations classification ;Series and parallel pumping systems.