



Skills and Knowledge of Cost Engineering

PROGRAM DESCRIPTION

This online program is offered in English and consists of seven courses. A course can be taken individually, or as part of the entire series. If a person is interested in becoming **CCEC Certified** it is highly recommended that she or he enroll and complete the entire series prior to taking the certification examination. The series or individual courses can also be taken as part of a professional development or continuing education endeavor.

Participants completing the entire Seven Course Suite earn 135 Professional Development Hours (PDH), and PDH are awarded for individual courses.

REGISTRATION

Access to an individual course is two weeks. During this period each course is open anytime and from anyplace in the world the Internet is accessible. If enrolled for the series, the participant may take the courses sequentially or concurrently – at the individual's discretion. Time-in-course begins when the individual is enrolled, generally within 24 hours of payment and registration with AACE. Access is provided for 14 weeks if enrolled for the entire seven-course series.

FEE

Seven Course Series:

\$2,200, AACE Member

\$2,500, Non-Member

Individual Course or Courses, per course (less than seven):

\$400, AACE Member

\$500, Non-Member

COURSE DESCRIPTIONS

COST

Due to the importance of the term the basic 'anatomy' of costing is discussed in this course. By dissecting how cost is organized, categorized and what makes up its parts, as relates to activities and/or assets, a solid knowledge foundation is laid for the succeeding courses that build upon it. Upon completion of this course, the participant will be able to, without reference:

- Understand what makes up cost—i.e. the basic resources (material, labor, etc.) that are needed to perform an activity or create an asset.



- Understand the distinction between cost elements that are directly applied to an asset and those that are indirectly applied.
- Relate the cost elements to the life cycle of the asset: acquisition, use, and disposal.
- Use the understanding of cost elements to further understand how cost is measured, applied, and recorded to arrive at the total activity and/or asset cost.
- Apply the knowledge gained to solve problems related to cost element source and definition.

COST ESTIMATING

Project success cannot be supported without **accurate knowledge of the cost ceilings** to which the project must be controlled, and those ceilings are imposed by budgets derived from **cost estimates**. Upon completion of this course, professionals will better understand cost estimating and will be able to, without reference:

- Explain the **common industry classifications** of cost estimates.
- Explain **common methodologies** applied to prepare cost estimates of the various classifications.
- Relate the **accuracy of estimate types** to the typical definition of scope and viable methodologies for the types.
- Explain how to apply **risk analysis techniques** to determine appropriate contingency for an estimate.

PLANNING AND SCHEDULING

Planning is the “Key” to effective project / process implementation. Planning has as its goal the discovery of the most effective way through all the issues and concerns of the stakeholders involved with the implementation of the project / process. The Planning Team is tasked to use their knowledge, experience, resources and supporting tools to plan the effective implementation of each major element of the programmed venture. The Team may be composed of different, highly skilled individuals at different stages of the venture who are able to implement their particular responsibilities to the benefit of the established goals. Planning is a synergistic process and is iterative. Planning must consider all the elements appropriate to the effort being undertaken, consider all stakeholder’s interest and concerns, develop effective alternatives, support negotiations to reach the most effective alternative, and monitor implementation. Upon completion of this section, professionals will better understand planning and will be able to, without reference:

- Set Goals and Objectives that a planned endeavor is to meet
- Gather stakeholder input and information
- Determine feasible alternative plans
- Choose best alternative
- Communicate the Plan
- Implement the Plan

- Adjust the Plan to meet new conditions as they arise, and,
- Review the effectiveness of the Plan against attainment of objectives.

Scheduling is the process that converts a project work plan into a road map, which if followed, will assure timely project completion. Scheduling is one of the tools used for monitoring and controlling projects to ensure that the objectives of cost, quality and time are met. Schedules provide a baseline against which progress is monitored, measured, reported and controlled. Schedules are used to assess time impact of changes to work scope. Scheduling provides a way of contributing input during project execution concerning means, methods, techniques, sequences, or other conditions affecting the plan's outcome. Upon completion of this section, professionals will better understand and be able to:

- Convert plan into a schedule
- Utilize schedules to monitor, control and report work progress
- Update for progress and incorporate change
- Analyze the schedule to identify critical activities and work paths, and forecast future trends

PROGRESS AND COST CONTROL

When the participant completes this course, he or she will be able to define, explain or clarify the process, purpose, advantages, and disadvantages succinctly in writing the following elements of progress and cost control:

- Measuring Work Progress
- Cost and Schedule Performance
- Productivity
- Fixed Budget
- Variable Budget
- Budget Baselines
- Schedule Baselines
- Control Account Baselines
- Status
- Analysis, Trending, and Forecasting
- Success Index (SI)
- Variability
- Incentives

PROJECT MANAGEMENT

In today's difficult, global business environment, it is vital that **project management** identify and control risks, maximize cost savings, minimize schedule delays, and improve economic return. This only can be achieved with effective and meaningful **project planning and organization**. Upon completion of this course you will be able to:

- Delineate the role of the project manager in project planning.
- State common planning strategies.
- List and explain the major components of project planning.
- Explain the importance of project planning.
- Calculate installed quantities (progress) for construction activities.
- Define how actual labor work hours are collected using time cards.
- Analyze labor cost performance using earned value.
- Analyze labor cost performance using unit rates.
- Define the three components of labor costs: quantities, installed production rates, and wage rates.
- Analyze labor cost performance using variance analysis.
- List and explain the basic requirements of a contract.
- Understand how contracts may become defective and, possibly, unenforceable.
- State the types of contracts typically employed in capital projects, their requirements, and the potential advantages and disadvantages of each.
- Relate typical project delivery methods to provisions of the contracts that are employed for each method.
- State and explain various key clauses in contracts.
- Clarify what sorts of claims may arise on contracts for capital projects.
- State how disputes arising under contracts may be resolved.

ECONOMIC ANALYSIS

Engineering economic analysis is a technique that assists in the solution of substantial engineering problems where economic aspects dominate over a considerable period of time. In this course the participant will review this technique of engineering economic analysis and upon completion of this course will be able to, without reference:

- Calculate simple and compound interest rates and solve interest problems using basic single payments, uniform series, and gradient formulas.
- Calculate present value, future value, and equivalent uniform annual value of a cash flow series.
- Determine the discounted rate of return of a cash flow series.

- Evaluate and select the best alternative using present value, future value, equivalent uniform annual value, and discounted rate of return.
- Compare alternatives using the benefit-cost ratio.

STATISTICS, PROBABILITY & RISK MANAGEMENT

The successful company collects information so that when analyzed, good decisions can be made. **Statistics** constitutes methods useful for the analysis of this information. One of the greatest risks to projects is the lack of adequate and appropriate **planning** and an important part of project planning is risk management. Risk management in all its forms both simple and complex will potentially have a positive effect on the implementation of projects. Upon the completion of this course, the participant will be able to:

- Explain basic definitions and terminologies in probability and statistics.
- Describe frequency distribution, cumulative probability curve and normal curve.
- Apply statistical techniques in decision making such as market and/or risk analyses.
- Explain basic steps of a risk management process.
- Describe risk mitigation options.
- Apply decision tree analysis.

WITHDRAWALS AND REFUNDS

You may withdraw from a course or courses by sending an email to <http://www.aacei.org/contact.shtml> requesting to be dropped from the course. Failing to participate in a course or courses after registering and paying the fee does not constitute officially dropping or withdrawing from a course or courses. Refunds are not automatic. NO refunds are due unless the course is officially dropped within stated guidelines in the refund schedule.

REFUND SCHEDULE

- All withdrawals must be submitted by e-mail.* Withdrawal received before the second day of enrollment: total fee less a \$400 cancellation fee for enrollment in the series (seven courses), and total fee less \$100 for enrollment in each individual course (less than seven courses).
- Refund requested after the second day and no later than seven days after the first day of class will be refunded 60% of the fee, after which time there is no refund.