



# Modern Engineering Economics

16 Hours PDH

## *Understand the Financial Decision-making Process for Engineering Projects*

*An intensive, introductory-level information-packed two-day seminar focused on:*

- Six Different Methodologies for Capital Expenditure Analysis
- How To Get Approval for Capital Expenditure (Engineering) Projects
- Understanding and Analyzing Financial Statements
- Cost Accounting: The Finances Behind Inventory Production and Control
- Fixed and Variable Manufacturing Costs and Break Even Analysis
- Understanding Using Excel to Calculate the Time Value of Money
- Calculating the Firm's Cost of Capital and Economic Value Added
- Constructing Decision Trees
- Excel Templates to Automate Financial Applications
- Financial Concepts You Need to Pass the PE Exam

*A practical seminar designed for engineering and production professionals on the fast track to top management including:*

- Civil, Mechanical, Nuclear, and Design Engineers
- Manufacturing, Production, Electrical and Industrial Engineers
- Product Engineers, Project and Plant Managers
- Manufacturing, Production and Operations Professionals
- R&D and Quality Control Professionals
- Cost Accountants and Financial Professionals who need a basic state-of-the-art refresher

***Master the part of the MBA financial program most essential to an engineer in just two days***

*We Guarantee Results*

**NCCE**

**National Center for Continuing Education**

World-Class Training Since 1984

**Schedule your custom in-house seminar today!**

**Telephone us at 850-561-6081 or email [contact@nccetraining.com](mailto:contact@nccetraining.com)**

*A Practical, Comprehensive Approach for Engineers. . .*

# Modern Engineering Economics

## What Attendees Will Learn

This seminar is designed to prepare engineering, manufacturing, production and operational professionals with the economic and financial knowledge they need to assist top management with strategic decisions related to large engineering projects.

NCCE's two-day, skill-based seminar, *Modern Engineering Economics*, will provide engineers with the on-the-job financial skills necessary to make financial decisions related to engineering projects. This seminar is also ideal for cost accountants and financial professionals who need a basic state-of-the-art refresher in capital budgeting, engineering economics and related Excel 2010 tools and techniques.

### ***Specifically, attendees will learn how to:***

- Calculate expenditure (engineering) proposals using six different methodologies – and know which method to use in different situations
- Understand and analyze financial statements and use financial ratios
- Use cost accounting, standard costs and variance analysis and activity based cost reports to improve production procedures
- Automatically calculate fixed and variable production costs
- Compute production break-even quantities
- Construct and use a decision tree

***Master That Part of the MBA Financial Program Most Essential for an Engineer  
In Just Two Days***

## Comprehensive Seminar Agenda . . .

### **Engineering Economics Overview**

- Engineer's role in business leadership
- Types of strategic engineering economic decisions
- Large-scale engineering projects
- The finance behind strategic engineering decisions

### **Using Financial Statements for Business Management**

- Understanding the Balance Sheet
  - o The basic accounting equation and the definition of capital
  - o How to instantly determine liquidity and too much debt
  - o How the firm gets equity: only two ways

- Using the Income Statement to Manage a Business
  - o How to use profit check points
  - o Why gross margin is the critical profit check point for engineers
  - o Inventory valuation and its impact on financial statements
    - Correctly pricing your product
    - Analyzing product line profitability
- Understanding the Statement of Cash Flow
  - o The business operating cycle: how a business earns its cash
  - o Depreciation expense vs. cash flow
  - o Sources and uses of cash: operations, investing and financing
  - o The engineer's focus on the investing part: capital budgeting

(continued on next page...)

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# Comprehensive Seminar Agenda (continued) . . .

- Financial Analysis and Ratio Calculations - what the numbers really mean
  - Analytical Review – Horizontal and Vertical
  - **Liquidity Ratios** - can the firm meet short-term obligations?
  - **Activity Ratios** – are the firm's assets smartly managed?
  - **Leverage Ratios** – Does the firm carry too much debt?
  - **Profitability Ratios** – Does the firm meet stakeholder expectations?
  - Predicting bankruptcy – what the firm needs to do to stay above water
  - Trends and graphs to troubleshoot numbers problems
- **At your request we can analyze the financial statements you select**

## Cost Concepts, Cost Classifications and Cost Analysis

- Cost flows in manufacturing
- Fixed and variable costs
- Standard costs and variance analysis
- Cost behavior – cost/volume/profit (CVP) analysis
- Using Excel's graphics function for instant regression analysis to easily determine fixed and variable costs
- Flexible budgeting for fixed and variable costs
- Using Excel Data Tables and Goal Seek for instant "what if" break-even analysis

## Understanding the Time Value of Money

- Future and present value calculations for a single amount
- Future and present value of a recurring annuity
- Nominal and effective interest rates
- Applications – loan analysis, buy vs. lease decision
- Excel's Function Wizard for convenient automated calculations

## Principles of Investing

- Investment basics: Liquidity, Risk and Return
- How to determine your expected return
- How to determine expected financial risk
- Investment strategies
- Group practice problems

## Capital Expenditure Analysis

- Evaluating Capital Expenditures (engineering projects)
- Non-discounted methodologies
  - Payback and return on investment (ROI) – accounting rate of return
  - Drawbacks and potential distortions
- Discounted methodologies
  - Net present value (NPV), discounted cash flow, (DCF) and discounted payback
  - Internal Rate of Return (IRR) and Modified Internal Rate of Return (MIRR)
  - Annual equivalent worth analysis (unit cost/profit calculations)
  - Using the profitability index (PI)
  - Benefit-cost ratio analysis for Government projects
- Methods of comparing alternatives
  - Total investment approach
  - Incremental analysis
  - Handling unequal service life problems

## Project Cash Flow Analysis/Select Discount Rate

- Estimating cash inflows and outflows
  - Net income vs. cash flow
  - Depreciation and corporate taxes
  - Calculating project cash flows
  - Effect of inflation on project cash flow analysis
- Cost of capital calculation
  - Calculating the after-tax cost of debt
  - Calculating the cost of equity
  - Calculating WACC – the weighted average after tax cost of capital
- How to Select Hurdle Rates
  - When project financing source is known
  - When project financing source is unknown
  - When capital is rationed
- Comprehensive Case Study: capital expenditure decision making

## Managing Project Uncertainty

- Describing project risk
- Sensitivity analysis
- Break-even analysis
- Scenario analysis
- Probability concepts
- Monte Carlo risk simulation using Excel
- Understanding decision trees
- How to construct a decision tree
- Comprehensive case study: project uncertainty

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# 25 + Key Benefits of Attending

Attend NCCE's **Modern Engineering Economics** seminar and in just two days you'll be equipped with the tools, techniques, and practical know-how to:

## **Assist with Strategic Planning**

- Learn about the finances behind strategic business decisions
- Undertake large-scale engineering projects with new financial knowledge

## **Use Financial Statements – The Language of Business**

- Understand the Balance sheet, income statement and statement of cash flows
- **Use financial ratios** for a rapid understanding of your company or a competitor
- Understand inventory production economics: standard costing, variance analysis, overhead, cost accounting, activity based costing, more . . .
- Receive a template to automatically calculate financial ratios

## **Understand Your Firm's Economics**

- Calculate your firm's weighted after tax cost of capital: step-by-step
- Determine your firm's return on invested capital
- Use an appropriate hurdle rate for your firm

## **Expertly Manage Factory Production Costs**

- Calculate fixed and variable production costs using regression analysis automatically . . . with just a few keystrokes
- Determine your factory's break-even for new projects
- Use flexible budgeting – plan for production output scenarios automatically . . . with just a few keystrokes

## **Think Like a Financial Pro – Understand the Time Value of Money**

- Calculate future and present values – for a single amount or recurring annuity automatically . . .
- Use Excel templates
- Understand discounted cash flow (DCF), net present value (NPV) and internal rate of return (IRR)
- Quantify risk by incorporating “hurdle rates” based on your firm's cost of capital and the risk of a project

## **Analyze and Select Capital Expenditure (Engineering) Projects Like a Financial Expert – Get the “Buy-In” for Capital Projects**

- Understand payback, return on investment (ROI) and the drawbacks of using these techniques
- Perform sophisticated discounted methodologies for Cap Ex evaluations such as: discounted payback, net present value, discounted cash flow and internal rate of return
- Use convenient, automated calculations with Excel
- Review a comprehensive capital expenditure case study

## **Master Project Uncertainty**

- Conduct sensitivity, breakeven and scenario analysis
- Use probability concepts and Monte Carlo risk simulation
- Understand and construct a decision tree

## **Meet Professional Obligations**

- Understand the financial concepts you must master to pass the PE exam
- Receive Professional Development Hours (PDH) to satisfy the PE Continuing Professional Competency CPC in many states. This seminar also qualifies for CPE credit for CPAs.

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## Key Benefits of a Custom In-House NCCE Seminar:

- **Targeted Training** - Customize your in-house program to your company's specific needs. Let us know which items in our seminar agenda you want to stress.
- **Customized Case Study** – Select any public company that you want to analyze - your firm, a client, competitor, etc. Your engineers will leave the seminar company with a detailed financial knowledge of this company. No other seminar company customizes to this extent.
- **Convenience** - Schedule your seminar when it's most convenient for you and your staff -- at your office or the location of your choice.
- **Substantial Savings** - Train a larger number of engineers and their staff for a significantly lower cost per person; avoid costly travel time and expenses. Cost effective for 10 or more employees. *Plus* your people have no travel costs when we train at your location - avoid travel costs.
- **Continuing Professional Development Hours (PDH)** - Enable your engineers to fulfill PDH requirements. This seminar is also approved for Continuing Professional Education (CPE) for CPAs who work in your organization and is a great refresher course.

Cost Per Seminar Attendee					
Participants	10	15	20	25	30
Total Seminar Cost	ASK US	ASK US	ASK US	ASK US	ASK US
Cost Per Person	<b>\$SAVE</b>	<b>\$SAVE</b>	<b>\$SAVE</b>	<b>\$SAVE</b>	<b>\$SAVE</b>

Bring this course in-house and provide custom designed training to your entire organization at a great cost savings! The fee includes a distinguished seminar leader at your site, a pretraining analysis and course tailoring with the instructor, full preparation of course materials, a seminar manual with your organization's logo emailed in electronic format to your director of documents, and much more. Your organization simply supplies meeting space, audiovisual equipment and participant refreshments; NCCE provides everything else including instructor travel expenses.

We have the quality programs and expert, experienced instructors to give your company an edge in today's competitive market. Improve communication, cohesiveness and efficiency through targeted professional development opportunities. NCCE's customized in-house training programs are a convenient, cost-effective way to provide your staff with critical information that will immediately add value to your organization.

If you are interested in an in-house seminar for your group, please take the time to look over and complete the questionnaire at the end of this brochure or [online](#). It will help you pinpoint your group's needs, and will assist NCCE in putting together a top-notch seminar for your organization.

**Telephone Tim at NCCE at 850-561-6081 or email [contact@ncctraining.com](mailto:contact@ncctraining.com)**

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# One Day Customized Option

We recommend the two-day seminar but companies wishing to save money might opt for a one-day customized seminar. We recommend the following outline for a one-day seminar that qualifies for 8 hours of PDH:

## Morning:

### 8:15 – 10:00am: Understanding and Analyzing Financial Statements

- Understanding/Using the Balance Sheet
- Understanding/Using the Income Statement
- Financial Analysis
  - Horizontal/Vertical Analysis
  - Ratio Analysis: Liquidity, Activity, Leverage, Profitability
  - Predicting Bankruptcy – Avoiding Bankruptcy
- Excel Worksheet

## Break

### 10:15 – 12:00pm: Time Value of Money and Its Operation

- Overview on Engineering Economic Decisions
- Time Value of Money
  - Present/Future Value of an Amount
  - Present/Future Value of an Annuity
  - Discounted Cash Flow (DCF) and Net Present Value (NPV)
  - Cap Rate vs. P/E Multiple vs. Payback
- Excel Worksheet and Excel Wizard Function for Automated Calculations

## Afternoon:

### 1:00 – 2:45pm: Evaluating Capital Expenditures (Engineering Projects)

- Non-discounted methodologies
  - Payback and Return on Investment (ROI)
  - Drawbacks/Potential Distortions
- Discounted Methodologies
  - Hurdle Rates: Overview of Cost of Capital
  - NPV, DCF and Discounted Payback
  - Internal Rate of Return (IRR) and Modified Internal Rate of Return (MIRR)
- Comparing Alternatives
  - Profitability Index
  - Total Investment v. Incremental Approach
  - Unequal Service Lives
- Excel Chart Wizard for Instant Communication

## Break

### 3:00 – 4:45pm: Evaluating Project Risk

- Cost/Volume/Profit (CVP) and Break-Even Analysis
  - Fixed and Variable Costs
  - Excel Regression Analysis Tool for Fixed/Variable Costs
- Sensitivity (What-if) Analysis with Excel Data Tables
- Monte Carlo Simulation with Excel Random Number Generator
- CVP Scenario Analysis

## Contact Us

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Call today to schedule your custom in-house training program.

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**By Phone:** 850-561-6081

**By Fax:** 850-222-4862

**Online:** [www.nccetraining.com](http://www.nccetraining.com)

**By Email:** [contact@nccetraining.com](mailto:contact@nccetraining.com)

**By Mail:** NCCE

967 Briarcliff Drive  
Tallahassee, FL 32308



## Continuing Education Credits

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This course qualifies for 16 Professional Development Hours (PDH) to satisfy the Continuing Professional Competency (CPC) requirement in many states. Contact NCCE at 850-561-6081 to find out about your state. You will also receive 1.3 CEUs for attending this course

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For CPAs this course is qualified with the National Association of State Boards of Accountancy for 16 hours in the area of Finance.

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## Who Should Attend?

All types of engineers, manufacturing and production professionals who need to understand all aspects of engineering economics. This seminar is especially helpful for those planning to contribute to the organization's strategic decision making process.

Included in this group are: Civil, Mechanical, Nuclear, and Design Engineers, Manufacturing, Production, Electrical, Nuclear and Industrial Engineers, Product Engineers, Project Managers and Plant Managers.

This seminar is also beneficial for cost accountants and financial professionals who need a basic state-of-the-art refresher in capital budgeting, engineering economics and related Excel 2010 tools and techniques.

This seminar is ideal for any engineer who requires a clear understanding of the financial concepts that must be mastered to pass the PE exam and also those engineers who must maintain professional development hours (PDH) for their PE license. For engineers this seminar qualifies for 16 Professional Development Hours. For accountants this seminar is also qualified for 16 CPE hours of Finance credit with the National Association of State Boards of Accounting.

## About the National Center for Continuing Education

Since 1984, the National Center for Continuing Education (NCCE) has produced and marketed continuing professional education and executive training nationwide. Our attendees consist of attorneys, CPAs, engineers, healthcare administrators, Fortune 1000 managers and business owners. We market training in major cities throughout the United States.

Some of our past in-house seminar clients include: Ernst & Young; Harley-Davidson; Hewlett-Packard; General Mills; Florida Power & Light; Polaroid; Pennzoil; U.S. Robotics; as well as law firms such as Jones Day Reavis & Pogue; King & Spalding; Weil, Gotshal & Manges; McDermott, Will & Emery and many others.

Our instructors are both knowledgeable professionals and entertaining, experienced speakers. They have formal education, industry experience and the platform skills required to deliver state-of-the-art training that can make a difference in your career.

## NCCE's Expert Seminar Leader . . .

### **Chan S. Park, Ph. D., PE**

Chan S. Park is a Professor of Industrial and Systems Engineering at a major southern university. Over his 30-year career he has been actively involved in a variety of research, teaching and professional consulting engagements on the topic of engineering economics.

Chan is a leading authority on engineering economics. His work is recognized internationally in the fields of engineering economics, strategic and economic decisions of advanced manufacturing system, financial engineering (real options valuation), risk analysis and public utilities. He has served as a consultant to Georgia Power, United Technologies, Daimler-Chrysler and Hyundai Motor (Korea).

Chan's work experience includes the U.S. Navy (systems analyst), Ashahi Electrical Insulator Mfg. (production engineer) and Marubeni-Ida, Japan (sales engineer).

Chan has authored or coauthored several leading textbooks including, Contemporary Engineering Economics, and Advanced Engineering Economics. Chan earned Industrial Engineering degrees from Purdue and the Georgia Institute of Technology (Ph. D.) and is a licensed Professional Engineer in the State of Florida.

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# NCCE In-House Seminar Questionnaire

## *Modern Engineering Economics*

### **Company/Firm:**

COMPANY/FIRM NAME \_\_\_\_\_ TELEPHONE NUMBER \_\_\_\_\_

MAILING ADDRESS \_\_\_\_\_ FAX NUMBER \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

### **Contact Person:**

SAL NAME \_\_\_\_\_ TITLE \_\_\_\_\_

CONTACT TELEPHONE NUMBER \_\_\_\_\_ EMAIL ADDRESS \_\_\_\_\_

### **Basic In-House Information:**

DATES DESIRED \_\_\_\_\_ LOCATION \_\_\_\_\_

HOW MANY WILL ATTEND? \_\_\_\_\_ ATTENDED NCCE TRAINING BEFORE? \_\_\_\_\_

ATTENDEE TITLES \_\_\_\_\_

ATTENDEE EDUCATION BACKGROUND AND EXPERIENCE \_\_\_\_\_

WHY IS TRAINING NEEDED? \_\_\_\_\_

PUBLIC COMPANY TO ANALYZE \_\_\_\_\_

### **Additional Information:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*We Guarantee Results*

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