COURSE NUMBER: PR3150

COURSE TITLE: Project Management and Financial Analysis

COURSE DESCRIPTION:

This course introduces learners to the topics of project management and financial analysis, by the introduction of the concepts, tools and techniques of formal project management and financial analysis. Topics include: project management, risk management, project scheduling, concepts of financial management, economic decision making, analysis of alternatives, and depreciation. Learners are introduced to the use of project management software.

PREREQUISITES: MA1101 - Mathematics

CO-REQUISITES: None

CREDIT VALUE: Four (4)

COURSE HOURS PER WEEK: Four (4)

LAB HOURS PER WEEK: Zero (0)

SUGGESTED TEXT:

Pinto, J.K. (2013). *Project management: Achieving competitive advantage* (3rd ed.). Pearson. ISBN-13: 9787-0-13-266415-8

Or

PMI. (2013). *A guide to the project management body of knowledge (PMBOK ®Guide)* (5th ed.). Author. ISBN-13: 978-1-93-558967-9

LEARNING RESOURCES:

Project Management Institute www.pmi.org

Source Forge Project Management Open Software http://sourceforge.net/projects/openproj

Microsoft – MSProject http://www.microsoft.com/project/en-us/try.aspx

Newnan, D.G., Whittaker, J., Eschenbach, T.G. & Lavelle, J.P. (2009). *Engineering economic analysis, second Canadian edition*. Oxford University Press. ISBN-13: 978-0-19-543017-2

Park, C.S. (2010). *Contemporary engineering economics* (5th ed.). Pearson. ISBN-10: 0136118488; ISBN-13: 978-0136118480

MAJOR TOPICS:

Part A: Introduction to Project Management

1.0 Project Management
2.0 Introduction to Risk Management
3.0 Project Scheduling
4.0 Project Cost Control

Part B: Financial Management

5.0 Concepts of Financial Management
6.0 Financial Decision Making
7.0 Analysis of Multiple Alternatives
8.0 Depreciation

LEARNING OBJECTIVES:

The expected learning outcomes are that the learner will be able to:

Part A: Introduction to Project Management

1.0 Project Management

1.1 Terminology
1.1.1 Understand and apply key scheduling terminology
1.1.1.1 Define "task"
1.1.1.2 Define "activity"
1.1.1.3 Project
1.1.1.3.1 Discuss the attributes that make up a project
1.1.1.3.2 Discuss the difference between a process and a project

1.1.1.4 Project Management
1.1.1.4.1 Identify common project management techniques
1.1.1.4.2 Discuss the importance of project management techniques

1.1.1.5 Scope
1.1.1.5.1 Create a scope statement for a project
1.1.1.5.2 Discuss the importance of scope management for project success

1.1.1.6 Discuss briefly the project life cycle and the activities that typically occur at each stage indicated: {Project Initiation, Project Definition, Project Planning, Project Execution, Project Close}

1.1.2 Strategic Objectives
1.1.2.1 Discuss how effective project management contributes to achieving strategic objectives
1.1.2.2 Explain the importance of identifying critical project stakeholders and managing them within the context of project development
1.1.2.3 Explain the impact that corporate structure and corporate culture can have on organizing for project management

1.1.3 Work Breakdown Structure
1.1.3.1 Work Breakdown Structure
1.1.3.1.1 Discuss the importance of creating a work breakdown structure for a project
1.1.3.1.2 Construct a work breakdown structure for a project
1.1.3.1.3 Construct a work assignment matrix for a project

2.0 Introduction to Risk Management

2.1 Risk Management
2.1.1 Define "project risk"
2.1.2 Discuss the factors that may potentially affect project completion

2.2 Risk Mitigation
2.2.1 Discuss risk mitigation strategies
2.2.2 Discuss the Project Risk Analysis and Management (PRAM) process

3.0 Project Scheduling

3.1 Terminology
3.1.1 Understand and apply key scheduling terminology
3.1.1.1 Define "task"
3.1.1.2 Define predecessor tasks
3.1.1.3 Define successor tasks
3.1.1.4 Define Project
3.1.1.5 Define Project Management
3.1.1.6 Define Activity
3.1.1.7 Define Critical Activity
3.1.1.8 Define Critical Path
3.1.1.9 Define Floats

3.2 Activity Networks
3.2.1 Create activity networks, including predecessor and successor tasks

3.3 GANTT Charts
3.3.1 Identify the critical path for an activity network using forward and backward passes

3.3.2 Calculate activity floats (free float, independent float and total float) for an activity network
3.3.3 Construct GANTT charts for given project activities

3.4 Time Estimates
3.4.1 Define the three time estimates for an activity (optimistic, most probable, and pessimistic)
3.4.2 Perform activity duration estimation based on the use of probabilistic estimating techniques
3.4.3 Activity Completion
3.4.3.1 Calculate standard deviation of activity times
3.4.3.2 Relate standard deviation to probability of completion
3.4.3.3 Calculate the probability of activity completion (Z)

3.5 Resource Management
3.5.1 Crashing
3.5.1.1 Define crashing
3.5.1.2 Analyze the benefits of crashing activities
3.5.1.3 Employ crashing techniques to reduce the duration of the critical path
3.5.1.4 Discuss how float times can be utilized to control a project

3.5.2 Resource Loading
3.5.2.1 Define resource loading
3.5.2.2 Discuss resource-loading techniques
3.5.2.3 Identify potential resource over-allocation situations
3.5.2.4 Construct a load histogram

3.5.3 Smoothing Techniques
3.5.3.1 Define smoothing
3.5.3.2 Discuss resource-loading techniques
3.5.3.3 Apply resource-leveling techniques to potential resource over-allocation situation

3.6 Project Management Software
3.6.1 GANTT Charts
3.6.1.1 Construct GANTT Charts utilizing software

3.7 P.E.R.T. Networks
3.7.1 Differences
3.7.1.1 Discuss the differences and similarities between a P.E.R.T. and C.P.M.
3.7.1.2 Discuss the differences and similarities between a P.E.R.T. and GANTT

3.7.2 Construct P.E.R.T.

3.7.2.1 Construct P.E.R.T. charts from previously constructed GANTT charts and vice-versa
3.7.2.2 Calculate the total standard deviation of a P.E.R.T. network
3.7.2.3 Calculate probability of project completion

3.8 Project Conclusion
3.8.1 Discuss the four main types of project termination
3.8.2 Identify the seven key steps in formal project closeout

4.0 Project Cost Control

4.1 Control Considerations
4.1.1 Describe project cost elements
4.1.2 Define project cost control
4.1.3 Explain how costs are monitored

4.2 Earned Value Management (EVM)
4.2.1 Define EVM
4.2.2 Explain the difference amongst planned value, actual cost and earned value
4.2.3 Explain how EVM is managed
4.2.4 Calculate EVM indicators
4.2.5 Apply EVM to project examples

Part B: Financial Management

5.0 Concepts of Financial Management

5.1 Interest and Equivalence
5.1.1 Define interest with respect to loans and investments
5.1.2 Define interest rate
5.1.3 Equivalence
5.1.3.1 Compare various methods of loan payback
5.1.3.2 Explain equivalence in reference to economy studies

5.1.4 Define present worth

5.2 Financial Mathematics
5.2.1 Single Payment Formulas
5.2.1.1 Apply the compound amount formula
5.2.1.2 Apply the present worth formula

5.2.2 Uniform Annual Series Formulas
5.2.2.1 Apply the series compound amount formula
5.2.2.2 Apply the sinking fund factor
5.2.2.3 Apply the series present worth factor
5.2.2.4 Apply the capital recovery factor

5.2.3 Functional Symbols
5.2.3.1 Express the interest formulas by means of functional symbols
5.2.3.2 Use interest tables to determine factors

5.2.4 Solve problems using interest factors
5.2.5 Nominal and Effective Interest Rates
5.2.5.1 Define nominal and effective interest rates
5.2.5.2 Calculate effective rate of a loan payback

5.2.6 Uniform Gradient Series
5.2.6.1 Define uniform gradient series
5.2.6.2 Convert gradients into annual series
5.2.6.3 Determine gradient factors from interest tables

6.0 Financial Decision Making

6.1 Equivalent Uniform Annual Cash Flow
6.1.1 Calculate total annual cost of alternatives
6.1.2 Cash Flow Tabulation
6.1.2.1 Prepare a cash flow table for alternatives
6.1.2.2 Explain the validity of total cash flow

6.1.3 Include salvage value in economy calculations
6.1.4 Alternatives with Different Lives
6.1.4.1 Compare annual costs when alternatives have different lives
6.1.4.2 Prepare a cash flow table for alternatives of different lives

6.1.5 Alternatives with Perpetual Lives
6.1.5.1 Determine capital recovery factor when n=
6.1.5.2 Calculate total annual cost of perpetual alternatives

6.2 Present Worth Analysis
6.2.1 Economic Comparison
6.2.1.1 Compare alternatives by calculating total present worth

6.2.2 Capitalized Cost
6.2.2.1 Define capitalized cost
6.2.2.2 Calculate present worth factor when n=
6.2.2.3 Calculate capitalized costs of alternatives

6.2.3 Planning for Growth
6.2.3.1 Explain why extra capacity may be installed initially
6.2.3.2 Compare installation of extra capacity with deferring the investment

6.2.4 Valuation of a Bond
6.2.4.1 Explain what is meant by a corporation bond
6.2.4.2 Define valuation
6.2.4.3 Calculate the purchase price of a bond to yield a specific interest rate

6.3 Rate of Return Analysis
6.3.1 Calculate rate of return of a net cash flow series
6.3.2 Estimate the rate of return by lump sum or average annual cost method
6.3.3 Calculate rate of return on a proposal with a distributed investment
6.3.4 Calculate rate of return on an alternate investment proposal
6.3.5 Compare two alternatives by calculating rate of return on the extra investment

6.4 Benefit-Cost (B/C) Ratio Analysis
6.4.1 B/C Ratio Method
6.4.1.1 Define benefits as related to engineering projects
6.4.1.2 Define costs as related to engineering projects
6.4.1.3 Describe the B/C ratio method of economic decision making

6.4.2 Benefit-Cost Ratio Analysis
6.4.2.1 Determine best alternative by B/C ratio based on present worth
6.4.2.2 Determine best alternative by B/C ratio based on annual costs

7.0 Analysis of Multiple Alternatives

7.1 Rate of Return Method
7.1.1 Prepare a comparison table for rate of return analysis
7.1.2 Determine basic rate of return on total investment for each alternative
7.1.3 Perform incremental analysis utilizing the defender/challenger method to determine incremental amount based upon required rate of return

7.2 B/C Ratio Method
7.2.1 Prepare a table for B/C ratio analysis
7.2.2 Calculate B/C ratios compared to existing plan
7.2.3 Determine best alternative by incremental analysis

8.0 Depreciation

8.1 Depreciation of Capital Assets
8.1.1 Define depreciation of a capital asset
8.1.2 Calculate yearly write-off by straight-line method
8.1.3 Declining-Balance Method
8.1.3.1 Calculate yearly write-off by declining-balance method
8.1.3.2 Calculate book value using declining-balance method

8.1.4 Sum-of-Years-Digits Method

8.1.4.1 Calculate yearly write-off by sum-of-years-digits method
8.1.4.2 Calculate book value using sum-of-years-digits method

8.1.5 Sinking-Fund Method
8.1.5.1 Calculate yearly write-off by sinking-fund method
8.1.5.2 Calculate book value using sinking-fund method

8.1.6 Comparison Between Methods
8.1.6.1 Solve a problem using all four methods
8.1.6.2 Compare rate of write-off for the methods

8.1.7 Explain how depreciation of capital assets affects income taxes

EVALUATION:

Assignments:	10%
Midterm:	30%
Term Project:	10%
Final Examination:	50%

DATE DEVELOPED: November 2007 **DATE REVIEWED:**

REVISION NUMBER: 3 **DATE REVISED:** March 2014

Note to instructor: Check PIRS to ensure this outline is the most current version.