

CE753- Construction Economics & Finance

Course Outline:

For any construction project to be successful, it must be technically sound and the resulting benefits must exceed the cost associated with the project. This course “Construction Economics and Finance” basically aims at describing various aspects of engineering economics. The field of construction economics and finance deals with the systematic evaluation of cost and benefit associated with different projects. The topics in this course cover principles of engineering economy followed by basic methods for carrying out economic studies considering the time value of money. The other topics include the demonstration of different methods namely present, future and annual worth method, rate of return, break-even comparison, capitalized-cost and cost-benefit analysis for the comparison of alternatives. In addition, other topics those will be covered are different methods of depreciation, taxes, and cost analysis of construction equipments followed by cost estimating. Further, topics on financial management namely construction accounting, financial statements, financial ratios and working capital management are also included in this course. The topics will be developed in a logical sequence. For clear illustration of concepts, a number of problems will be solved. This course will definitely help the students in understanding the underlying principles and concepts in construction economics and finance.

Course Objectives:

- To bring about an exposure to construction economics, financing and accounting methods and their usefulness in controlling construction projects.
- To study the elements of construction economics.
- To study the need for financial management and means of achieving the same.
- To study a accounting methods used in construction field.

Pedagogy:

This course is delivered through a combination of lectures, seminars and group work on case studies, exercises and problems.

Evaluation:

Assessment is through 2 Cycle Tests of 15 marks each (30%), Assignments (10%), Tutorial (10%) and End Sem Examination (50%).

No. of Credits:

3 (3 Lectures/ week)

Attendance: A minimum of 75% attendance is necessary to take up the final examination

Unit 1: Construction Economics- Principles of Time value of Money

Introduction: The purpose of this module is to introduce you to the math of finance. The focus of this module is on the time value of money – the valuation of cash flows at different points in time. This is an essential tool in financial decision-making because decisions are made considering benefits and costs that occur at different points in time. Your financial calculator is a wonderful tool that can be used to do the hard work in the calculations. However, mastery of financial math requires understanding the mathematics behind the calculations that your calculator performs. Why bother knowing what’s behind it all? Because not every financial transaction fits neatly into the financial calculator’s programs. The tools that you will learn in this module are necessary to understanding securities’ valuation and capital budgeting, which are key topics in financial decision-making. An added benefit to learning financial math is that you will be better prepared for consumer-finance decisions. For example, with the math that you learn in this module you will be able to calculate the true, effective rate of interest on a car loan and the true, effective rate on credit card borrowing. You may have some experience with financial math from other coursework, but we will be covering the financial math with more depth than most other courses. This is necessary in order to set the stage for the more intense requirements of capital budgeting

Topic	No. of hours
Basic principles – Time value of money	2
Quantifying alternatives for decision making, Cash flow diagrams, Equivalence- Single payment in the future (P/F, F/P)	2
Present payment compared to uniform series payments (P/A, A/P)	2
Future payment compared to uniform series payments (F/A, A/F), Arithmetic gradient, Geometric gradient.	2
Total	08

Learning Outcomes:

- i. Apply valuation principles to calculate the future value of lump-sum amount.
- ii. Apply valuation principles to calculate the present value of a lump-sum amount.
- iii. Distinguish between discrete and continuous compounding of interest.
- iv. Calculate the FV and PV of a lump sum for different compounding frequencies, including continuous compounding.
- v. Apply valuation principles to calculate the future value and the present value of a series of cash flows.
- vi. Distinguish between an ordinary annuity and an annuity due.
- vii. Calculate the present value lump-sum amount for a deferred annuity.
- viii. Solve for the deposits or withdrawals in a deferred annuity.
- ix. Amortize a loan, breaking out both interest and principal payments, for loans with and without a balloon payment.
- x. Solve for the interest rate for both lump-sum and annuity situations.
- xi. Solve for the number of periods for both lump-sum and annuity situations.
- xii. Convert an APR into an EAR, and vice-versa.

Unit 2: Costing

Introduction: we look at the problems of cost measurement and control within management accounting and in particular at the issues of cost and resource allocation. We describe the traditional resource-based systems of cost allocation using a variety of cost drivers and applied to firms with service and cross-functional departments. The conceptual issues with cost allocation are then explored and a range of managerial interpretations offered as to why rational competitive firms engage in what from an economic perspective is irrational costing practice. From this, we explore some of the more modern methods of cost and resource allocation using output and activity measures.

Topic	No. of hours
Introduction to Cost Accounting	1
Elements of costs	1
Cost Sheet	2
Marginal Costing	2
Break Even Analysis	2
Variance Analysis	2
Total	10

Learning Outcomes:

- i. Identify cost classifications based on how the cost will be used: whether for preparing external reports, predicting cost behavior, assigning costs to cost objects, or decision making.
- ii. Identify the costing method to use in custom situations and in mass-production situations and know how to apply those methods.
- iii. Identify various cost classifications based on how costs respond to changes in production levels, and how those changes affect managements' decision to expand or reduce capacity levels.
- iv. Explain the critical tradeoffs existing between total cost and sales volume in determining desired profit goals.
- v. Prepare an income statement required for external reporting and a different one more useful to managers for managerial decision-making.
- vi. Evaluate business segments and the managers responsible for those business segments.

Unit 3: Accounting Methods

Introduction: Fixed assets like plant and machinery etc. are used in the business for the purpose of production of goods or for providing useful services in the course of production. These fixed assets are utilized during operations of a business for a number of successive accounting periods. Value of such fixed assets decreases with passage of time and its utilization i.e. wear and tear. Value of portion of fixed asset utilized for generating revenue must be recovered during a

particular accounting year to ascertain true income. This portion of cost of fixed asset allocated to a particular accounting year is called depreciation.

Topic	No. of hours
Depreciation Accounting	2
Income Tax Accounting	1
Inflation Accounting	2
Replacement Analysis	2
Total	07

Learning Outcomes:

- i. Grasp the meaning and nature of depreciation.
- ii. Determine the amount of depreciation from the total value of the fixed assets and its useful life.
- iii. Understand various methods of depreciation and learn advantages and disadvantages of such methods
- iv. Identify the major ways that companies and their financial statements are impacted by inflation.
- v. Understand the differences between general purchasing power and current value approaches to inflation accounting.
- vi. Pretax financial income vs. taxable income.
- vii. Temporary diff that result in future taxable amounts.
- viii. Purpose of a deferred tax asset valuation allowance.
- ix. Tax rates, tax rate changes on deferred inc.taxes .

Unit 4: Construction Costing

Introduction: Cost estimating is a function that is central and indispensable for every construction contracting business. Estimating can be defined as the estimator's making the best possible prediction of what the cost of performing a construction project will be, given the time and other resources available. Construction estimating involves the determination and analysis of the many factors that influence and contribute to the cost of a construction project. Estimating, which is done prior to the physical performance of the work, requires detailed study of the bidding documents, as well as a careful analysis of numerous factors that will have a bearing on construction costs. Estimators apply their knowledge and skills, carefully analyze the construction documents, and examine as many other factors and influences as they can foresee, and then, through the application of their skills, produce this prediction—the cost estimate.

Topic	No. of hours
Methods of construction costing	2
Escalation clause	1
Sources of Finance & Infrastructure Financing	2
Life cycle costing, construction cost control	2

Personnel costs, equipment costs	2
Job in directs and markup	1
Total	10

Learning Outcome:

- i. To understand the role of estimating in the construction industry.
- ii. To analyze construction documents and perform quantity takeoff.
- iii. To apply pricing data to takeoff quantities.
- iv. To understand bid procedures, controls and strategy.
- v. To know the different sources of finance to fund construction projects.

Unit 5: Financial Statement Analysis

Introduction: Financial statement analysis is, of course, the underlying purpose of preparing financial statements. Everyone who looks at your financial statements will be automatically performing some form of analysis. Your banker will quickly analyze them to determine your capability for paying back a loan. Your investor(s) will always perform a financial statement analysis to determine if your business is a good investment, or whether you have been performing according to plan. Your suppliers will analyze your financial statements to determine your credit worthiness—and so on. The important thing to remember is: everyone who looks at your financial statements will conduct a financial statement analysis, in one form or another. That is why your statements need to be as accurate and truthful as possible. You, as well as your business, will be judged according to your financial statements. But the most important aspect of financial statement analysis is the analysis you perform yourself.

Topic	No. of hours
Preparation of Balance sheet & Profit and loss accounts	2
Ratio analysis	2
Funds flow statement, Cash Flow statement	2
Working capital management	2
Financial Control- Management accounting	2
Total	10

Learning Outcome:

- i. To Understand the analysis framework and financial statements.
- ii. To Analyze financial statements from the viewpoints of investors, creditors and management.
- iii. To Interpret financial statements and related reports of companies.
- iv. To Understand the process that generates accounting numbers and its implications for the quality of those numbers for decision purposes.
- v. To Understand the business environment a company operates in and the financing, investing and operating strategies of a company.
- vi. To Apply different tools and techniques for assessing a company's performance, such as financial ratios, cash flow an analysis and forecasting techniques.

References:

1. Blank, L.T., and Tarquin,a.J (1988) Engineering Economy,4th Edn. Mc-Graw Hill Book Co.
2. Collier C and GlaGola C (1998) "Engineering Economics & Cost Analysis", 3rd Edn. Addison Wesley Education Publishers.
3. Patel, B M (2000) "Project management- strategic Financial Planning, Evaluation and Control", Vikas Publishing House Pvt. Ltd. New Delhi.
4. Steiner, H.M. (1996) "Engineering Economic principles", 2nd Edn. Mc-Graw Hill Book Co.
5. Maheshwari S.N., (1996), Management Accounting and Financial Control, 10th edition, Sultan Chand & Sons, New Delhi.