MG 286 JAN 3:0

PROJECT MANAGEMENT

Instructor

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Department: MANAGEMENT STUDIES

Course Time: WED 2:30 - 5:30 PM

Lecture venue: CLASS ROOM #2 MANAGEMENT STUDIES ANNEXE

Course Page: http://mgmt.iisc.ernet.in/~piyer/PPI%20Engg%20Proj%20Mgmt%20Chapter%2001%20Introduction%2010-01

Announcements

Deliverables: The Study Project

The main deliverable from you in this course will be a set of assignments, relating to a study project of your choosing. Since you probably will not work in isolation when you launch your new project, we will also expect you to work in teams of 3 or 4 students, to perform the following exercises on your study project;

1.to define the nature of the project, the organization, the industry, the environment, the need for project management, and the form of appropriate project management;

2. to apply the system approach to your study project, and to undertake the development of a general systems model;

3. To define the scope of the study project, and do a work definition and work breakdown structure(WBS);

4.to undertake time estimation and schedule preparation of the study project, using single-time PERT, three-time PERT, and CPM; 5.to prepare a financial appraisal of the study project;

6. to build cost estimates and budget for the study project;

7. To perform project monitoring and control, using the schedule variance analysis and the cost variance

analysis; to perform earned value analysis; and

8.to use MS Project for analyzing the study project. All assignments may be submitted both electronically and in hard copy. All electronic submissions should be addressed to piyer@mgmt.iisc.emet.in, with copies to piyeriisc@gmail.com. For the final study project submission, a formal power point presentation should be given, in addition to the detailed business plan itself.

Schedule of Study Project Deliverables

Assignment # Week# Description

13 Define the nature of the project, the organization, the industry, the environment, the need for project management, and the form of appropriate project management;

24 Apply the systems approach to your study project, and to Undertake the development of a general systems model;

35 Define the scope of The study project, and do a work definition and work break down structure(WBS)

7 Presentation#1 in class, of the first part of the study project

49 Under take time estimation and schedule preparation of the study project, using single-time PERT, three-time PERT, and CPM;

5 11 Prepare a financial appraisal of the study project; build cost estimates and budget for the study project;

13 Presentation #2 in class, of the second part of the study project;

6 15 Perform project monitoring and control, using the schedule variance analysis and the cost variance analysis; to perform earned value analysis;

16 Final presentation in class, of the entire study Project analysis

Required Readings and Materials: The text book for this Course shall be: Parameshwar P. Iyer. Engineering Project Management with Case Studies, Vikas Publishing House Pvt.Ltd. NewDelhi,2005.(Textbook).

Other reference books may be:

Project Management Institute(PMI). A Guide to the Project Management of Knowledge (PMBoK). Newton

Square, PA.1996.(Reference)

J.R.Meredith and S.J.Mantel. Project Management: A Managerial Approach .John Wiley and Sons.NewYork.1995.(Reference).

Evaluation and Grading: The Course grading shall be based on the following:

1. Mid-semester examination :10%

2. Study project : 30%

3. Case analyses and presentations :I0%

4.End-semester examination :50%

Total: 100%

Leaning Schedule:

1. Week #1: Concepts of project definition, lifecycle, and systems approach;

2. Week#2: -Do-

3. Week#3: Project scooping, work definition, and work break down structure(WBS);

4. Week#4:Time estimation and project scheduling, including PERT and CPM

5. Week#5: -Do-

6. Week#6: Guest Lecture; Case Analysis

7.Week#7: Class Presentations#

8.Week#8: Mid semester examination; Guest lecture

9. Week#9:Financial appraisal; cost estimates and budgeting.

10. Week#10: -Do-

11.Week#11: Guest Lecture, Case Analysis

12.Week#12: Project monitoring and control

13.Week#13: Class Presentations #2

14.Week#14: Special topics: Risk and quality

15.Week#15: Computers in project management: MS Project

16. Week#16: Final class presentations: Final examination

Brief description of the course

Course Purpose:

With increasing technological and scientific advances, the efficient and effective planning and implementation of major projects, especially in hi-tech sectors, is becoming increasingly complex and critical. This course is aimed at providing both basic and some advanced exposure to PM, so as to enable the manager of tomorrow to successfully complete sophisticated projects within the constraints of capital, time, and other resources.

Objectives and Teaching Methods:

The course aims at the following learning targets:

1. To understand the concepts of project definition, lifecycle, and systems approach;

2. To develop competency in project scooping, work definition, and work breakdown structure(WBS);

3. To handle the complex tasks of time estimation and project scheduling, including PERT and CPM

4. To develop competencies in project costing, budgeting, and financial appraisal; 5. To gain exposure to project control and management, using standard tools of cost and schedule variance analysis;

6. To appreciate the elements of risk and quality in hi-tech projects;

7. To learn project management by practice, through the medium of study projects; and

8. To appreciate and understand the use of computers in project management, especially a tool like MS Project.

l. Moduleiâ,¬" I: Project Definition

Introduction to Project Management

Need for Project Management

Characteristics of Engineering Projects

Forms of Project Management

II. Moduleiâ,¬" II: Systems Approach

Introduction to Systems Approach

General systems Model

Systems Design Algorithm

Feasibility Study, comprising Needs Analysis, System Identification, Synthesis of Solutions, and Complete Feasibility Analysis

lll.Moduleiâ,¬" III: Work Definition and Planning Work Definition, and Preliminary Planning

Work Breakdown Structure(WBS)

Responsibility Matrix Integrating WBS and Organization Structure

IV. Module aâ,¬" IV: Project Scheduling and Time Management

Activities, Events, and Work Packages Gantt Charts

PERT Scheduling : Single Estimate

PERT Scheduling: Three Estimate CPM Scheduling with Resource Constraints Cost Estimation and Budgeting Cost Schedules and Forecasts Financial Evaluation of a Project Social Cost Benefit Analysis

V. Moduleaâ,¬' 'V: Project Costing and Financial Management

Cost Estimation and Budgeting Project Cost Accounting System Cost Schedules and Forecasts

Financial Evaluation

Social Cost Benefit Analysis

VI. Modulea â,¬"VI: Project Control and Management

Phase and types of Project Control Variance Analysis of Project Performance Problems of Project Control

Role of the Project Manager Teamwork and Leadership

Functions Computers in Project Management

Prerequisites

Bachelors in any Discipline, and preferably a Masters in Science, Engineering, or Management

Syllabus

MG286(AUG)3:0 Project Management

The systems approach, project organization, work definition, scheduling and network analysis, PERT and CPM, resource3â,¬" constrained scheduling, project costing and assessment, project control and management, software for project management, management of hi-tech projects, including software projects, quality and risk management

Parameshwar P Iyer

Course outcomes

The course aims at the following learning targets.

1. To understand the concepts of project definition, life cycle, and systems approach;

2. To develop competency in project scooping, work definition, and work breakdown structure(WBS);

3.To handle the complex tasks of time estimation and project scheduling, including PERT and CPM

4. To develop competencies in project costing, budgeting, and financial appraisal; 5. To gain exposure to project control and management, using standard tools of cost and schedule variance analysis;

6.To appreciate the elements of risk and quality in hi-tech projects;

7. To learn project management by aâ,¬cepracticeaâ,¬â€¢, through the medium of aâ,¬restudy projectsâ,¬; and

8.To appreciate and understand the use of computers in project management, especially at tool like MS Project.

Grading policy

Evaluation and Grading:

The Course grading shall be based on the following:

1. Mid-semester examination :10%

2.Study project :30%

3.Case analyses and presentations : 10%

4.End-semesterexamination :50%

Total: 100%

Assignments

Section A: The Study Project

Management education, training, and development, rely as much (if not more) on the ae artaETM of doing things, as on these scienceaâ,¬TM of the systems and procedures. With this philosophy in mind, and with the intention of giving the reader a aâ,¬1.iveaâ,¬TM experience of project management, the author strongly recommends every reader of this book to select a ae study projectafTM. The exercises On the study project at the end Of each chapter aim to Simulate actual participation in ae real lifeTM projects.

For those readers who are professional managers/engineers working on aerealaâ,¬TM projects, the Selection of the study project should be relatively simpleaâ,¬" as a matter of fact, quite obviously, the project that they are working on currently. For the other readers, who are probably students of management (either formal or non-formal), it would be advisable to select a study project where they can take the role of an aâ,¬-observer or aâ,¬TMoraacwitnessaâ,¬â„¢.

ln either of the above cases, the study project selected for further investigation and analysis should satisfy the following requirements:

It should be a real project; one that is either currently on-going or else has been recently completed;

Information about the study project (such as the actual scope of work, duration, cost estimates of various tasks, organization of the project, personnel, etc.)

Should either be readily available, or it should be possible to get the required data directly or indirectly (from primary or secondary sources);

"The project should be atleast of a certain Ccriticaliâ,¬â„¢size, say, having at least five staff members, spanning a duration of three months, costing around Rs1,00,000, and having specific end-results; and

In the class-room (or collective learning environment), it is preferable to form a a study group3â,¬â„¢off four to six persons to investigate and analyse the study project. The intricacies and dynamics of the study group will itself offer valuable lessons in project management!

ASSIGNMENT #1:

1. What are the characteristics of the organisation, the project objectives, the specific activities, and the environment that make the use of project management appropriate? Take factors such as size, complexity, cost, risk, and reputation into consideration.

2. In what ways do the characteristics of the study project fit the definition of a aâ,¬Nprojectaâ,¬â„¢?

3. Analyse the role of the project manager. Is he/she an expediter, a coordinator, a pure project or a matrix manager? Comment on the designation and actual functions (vis-Ã -vis the formal job description) of the project manager.

ASSIGNMENT #2 :

1. Describe your study project as a acsystemaâ,¬â„¢ in terms of its components, their inter-relatedness, and the overall objectives.

2.Prepare a general systems model of your study project, identifying the following (in as much detail as you can):

a. The system inputs, x(t),

b. The system outputs,y(t),

c. The system parameters, fiifTM,and

d. The environmental parameters, E(t).

3. Prepare an executive summary on the systems approach to your study project (not exceeding 1500 words).

4. Conduct a detailed feasibility study on alternative solutions to meet the effective needs of your study project. Be sure to incorporate the following:

a. A statement of the primitive need(s);

b. A needs analysis;

c. A detailed identification of

the system, in terms of inputs, outputs, design parameters (along with constraints for each), and the criteria for evaluation;

d. Synthesis of solutions; and

e. A detailed analysis of the physical, financial, economic, (and, if possible) social and political feasibility.

ASSIGNMENT#3

1. Prepare a Work Breakdown Structure (WBS) for your study project, focusing on the end-items, products/hardware, or tasks to be performed. Include the tasks of management, office administration, supervision, and /or maintenance, as applicable and relevant to your project. It is advisable to attempt at least three levels/hierarchies in the WBS.

2. Assign responsibilities in the WBS to the project organisation, i.e. determine the functional areas to be involved in the project implementation and delineate their respective tasks.

3.Prepare an overall responsibility matrix for your study project, outlining the responsibilities of all the project personnel for the identified work packages in Question I above. Is there need for any further breakdown of work? Explain.

4. Having seen the importance of planning in project management, prepare a detailed plan for the study project. The plan should include, but need not be restricted to, the following elements:

a. Project summary

b. Specifications

c.Work statement

d. Master schedule

e. Procedures guide

f. Budgets and control systems

g. Responsibility matrix

h. Project organization plan

i. Activity/event network plan

j. Project personnel plan

Are there any other elements, not mentioned above, that need to be included in the detailed project plan? If so, incorporate them.

ASSIGNMENT#4

1. How were the activities in the WBS of your study project transferred to a schedule? How were activity times estimated? Who prepared the schedules?

2. Based on the work packages/activities identified in the WBS for your study project, draw the AOA and AON network diagrams.

3. Conduct a PERT analysis, based on the above AOA network diagram, for your study project, by including the following:

a. Calculation of the earliest expected and the latest allowable times for all the events;

b. Identification of the critical and near-critical paths; and

c. Explanation of the physical significance of the activities on the critical path(s).

4. At what stage of the project life cycle was the PERT analysis done in your study project? What is the periodicity of the monitoring/review that is scheduled to be done?

5. Do you have sufficient data to arrive at three time estimates for each activity of your study project? If so, carry out the three-estimate PERT analysis, and make relevant statistical inferences. If not, what do you propose to do in order to facilitate the availability of such data?

6. Prepare a table of normal and crash durations and costs for all the project activities, and compute the cost-time slope for each activity..

7. Starting from the normal duration and cost for your study project, selectively crash the project activities. At

what stage will you decide to stop the iterations in the CPM analysis?

8. Estimate an equation for the indirect project cost as a function of the expected project duration. Add the direct and indirect costs to determine the total project costs at various durations. What is the optimum schedule for completing your study project, at a minimum total project cost?

9. Make a linear programming formulation of the time-cost trade-off problem for your study project.

ASSIGNMENT#5

1. Describe the cost estimation process used in your study project. When did cost estimation take place? Who was involved? How were the costs estimated, and how were the estimates checked and accumulated? How were they related to the WBS?

2. What kind of Project Cost Accounting System (PCAS) was used in your study project? Describe the system, and its inputs/outputs. Who maintained thes ystem? Was it manual or computerised? How was it used during your project?

3. Prepare cost schedules and forecasted project costs for your study project, using early start times and late start times for all the activities. Discuss the significance of the feasible budget region. How was this used in the implementation of your study project?

4. Indicate the apportionment of indirect costs in your study project, showing the elements of the direct Overheads(OH) and the indirect General & Administrative (G&A) expenses. What basis Was used for estimating and allocating the above indirect costs?

5. Conduct a financial appraisal of the capital investment in your study project using the following methods:

a. Rate of Return(RR)method;

b. Payback(PB)method;

c. Net Present Value(NPV) method; and

d. Discounted Cash Flow(DCF) method

Discuss the significance of the results of the above appraisal. What was the ultimate criterion used for

deciding on the viability of the proposed investment in your study project?.

ASSIGNMENT #6

1. What kinds of external and internal control measures were used in your study project? Describe the measures, such as work package control, cost account control, etc..

2.Describe the project control process in terms of the work authorization, data collection, performance, monitoring, variance analysis, and taking corrective action. Who had the primary responsibility for these tasks?.

3. How was the performance in your study project monitored? What performance and variance measures were used?. Give typical results of the project performance review, in terms of BCWS, ACWP, BCWP, CV, SV, SPI, and CPI at important review dates.

4. When cost, schedule, or perfotanance problems occurred in your study project, what action(s) did the project manager take? Give a few exaanples of the problems and the corrective actions taken. List some typical problems encountered in implementing the project control process.

5. In your study project, what is the formal title given to the role of the project manager? Where in the organization structure is the project manager? Briefly describe his role, and list out his specific responsibilities.

6. Describe the kind of authority given to the project manager in your study project. How is this communicated to him? Is there an authority gapAâ,¬â€¢?

7. What has been the role of the top management in your study project? What is its involvement in other projects in the organisation?.

8. How would you characterize the leadership style of the project manager in your study project? Is it more task-oriented or more relations-oriented? Is the style of leadership used appropriate, vis-Ã -vis the task structure, leader-member relations, and position power in your study project?

9. What do you think are the primary work motivators for the staff in your study project? Is it the salary, or the

career potential, or the participation in decision-making, or what?

10.Describe the Project Management System(PMS) used in your study project. If it is a manual PMS, how effective is it, in terms of speed, capacity, efficiency, and economy?.What parts of it would you recommend for replacement with a computerized system? If a computerized PMS is being utilised, does it include the functions of scheduling, budgeting, cost control, performance analysis, etc.?If several systems are used, how are they integrated?.Does the PMS meet the information requirements in your study project?

Resources

lyer, Parameshwar P.,Engineering Project Management with Case Studies,Vikas Publishing, New Delhi,2009.

Project Management Institute, USA. A Guide to the Project Management Body of Knowledge. Newton Square, PA.1996.

Meredith, J.R., and Mantel, S.J. Jr., Project Management: A Managerial Approach, John Wiley and Sons, NY, 1995.