MEC 7201 Engineering Project management

Course Description

An overview of the theory and practice of managing projects in any organization, applying widely used software tools for project management and risk analysis. Emphasis is on leadership in project management: managing projects or tasks in a team environment; building teams; and utilizing communication, organization and conflict management skills. Discussion covers the various phases of a project, including initiating, planning, executing, monitoring and controlling, and closing the project. Topics include analytical approaches and quantitative methods in project management, such as earned value management and techniques for estimating project duration and cost, optimizing allocation of resources, expediting projects and scheduling algorithms. Simulation tools and statistical techniques are used to analyze uncertainty in project selection, budget allocation and time estimation. Project management knowledge areas are examined and linked to industry practices for successful management of projects.

AIMS:

As technological integration and construction complexity increase, so does construction lead times. To stay competitive companies have sought to shorten the construction times of new infrastructure by managing construction development efforts effectively by using different project management tools. In this course, three important aspects of project management are taught:

- the theory, methods and quantitative tools used to effectively plan, organize, and control projects;
- efficient management methods revealed through practice and research;
- Hands-on, practical project management knowledge from on-site situations and field trips.

The aims of this course are to:

- Enable students appreciate the role of projects in any industrial setting.
- Give students and understanding of the conduct of projects in all its various aspects such as project planning and management, tendering and procurement.

Detailed Course Content:

1. Foundations of Project Management (3 Hours)

An overview of the theory and practice of managing projects in any organization. Emphasis is on leadership in project management: managing projects or tasks in a team environment; building teams; and utilizing communication, organization and conflict management skills. Discussion covers the various phases of a project, including initiating, planning, executing, monitoring and controlling, and closing the project. Project management knowledge areas are examined and linked to industry practices for successful management of projects. The goal is to gain a solid understanding of how to successfully manage each phase of the project life cycle, work within organizational constraints, set goals linked directly to stakeholder needs and utilize proven project management tools to complete projects on time and within budget while meeting specifications. Essential concepts, processes and techniques are applied through management of a team project, which requires regular progress reports and reviews.

2. Project Risk Management (6 Hours)

An in-depth analysis of risk management methodologies, from both strategic and tactical perspectives. State-of-the art tools and techniques for identifying, measuring and monitoring risks in the project management environment are examined. Both qualitative and quantitative risk analyses are conducted, and strategies for proactive risk aversion and reactive risk response are developed. Focus is on how a comprehensive risk management approach can enable a project team to proactively manage issues that adversely impact the successful control and completion of a project.

3. Project Communications Management (3 Hours)

An overview of conflict resolution processes and methods and the skills needed to manage the human elements within project management—a task as challenging as managing the technical aspects. Topics include critical communication and conflict resolution issues faced by project workers in today's global corporate environment. Innovative approaches to successfully negotiating and resolving conflicts among team members, colleagues, managers and stakeholders are introduced and practiced. Proven techniques to make conflict a constructive—rather than a destructive—experience are analyzed. Emphasis is on case study analysis, effective communication behaviors, negotiation skills and virtual team processes to successfully lead both domestic and global projects.

4. Project Quality Management (9 Hours)

A study of the policy, processes and procedures involved in assuring that projects will satisfy the objectives for which they were undertaken. Emphasis is on quality planning, quality assurance, quality control, and process improvement. Discussion covers all the activities that determine quality objectives, policies, and responsibilities. The importance of customer satisfaction, prevention over inspection, management responsibility and continuous improvement is recognized. Topics include control charts, cause and effect diagrams, Pareto charts, failure mode and effect analysis, design reviews and cost of quality. Course content and approach are compatible with the International Organization for Standardization.

5. Project Procurement Management (6 Hours)

An examination of the tools needed for project procurement management. Focus is on determining what needs to be purchased or acquired and determining when and how to acquire it. Topics include planning the contracting efforts (documenting products and services and identifying potential sellers); requesting sellers' responses (obtaining information, quotation, bids, offers or proposals); selecting the seller (receiving and reviewing offers, selecting among those potential offers and negotiating a contract); administering contracts (managing the relationship between buyers and sellers, including documentation, corrective actions and contract changes); and closing contracts (completing the contract and settling all open issues).

6. Financial and Strategic Management of Projects (9 Hours)

Financial and strategy making in project management. Covers: project cost estimation developed from work breakdown structure; formulating, monitoring and controlling project budgets; impact of project scope and schedule; managing project changes; management reserves to cover risks and contingencies; top-down and bottom-up budgeting; Earned Value Management as a key tool to monitor, evaluate and forecast project costs, schedule, results and performance; deriving project cash flows; investment project evaluation; discounted cash flow, internal rate of return and net present value methodologies; cost of capital; and capital budgeting. Broader issues examined include links between project and corporate financial performance, business ethics, corporate social responsibility, project and organizational culture issues, communications and information flow, financial risk analysis and project sustainability, for government as well as privately funded projects.

7. Advanced Project Methods (9 Hours)

An overview of advanced methods of managing projects, applying widely used software tools for project management and risk analysis. Topics include analytical approaches and quantitative methods in project management, such as earned value management and techniques for estimating project duration and cost, optimizing allocation of resources, expediting projects and scheduling algorithms. Simulation tools and statistical techniques are used to analyze uncertainty in project selection, budget allocation and time estimation. Discussion covers project portfolio management and how multiple projects and programs fit into strategic direction of an organization. The processes, tools and techniques of project management are applied to a team project with emphasis on quantitative and analytical methods.

Learning Out Comes

At the end of this course, a student should be able to:

- Distinguish between a programme, project and a routine activity
- Demonstrate knowledge and skills of processes, techniques, standards, empirical guidelines, computer software, team building used in project
- Develop project requirements especially human and financial
- Explain the various project monitoring and control techniques

Teaching and Learning Pattern

The teaching of students will be conducted through lectures, tutorials, short classroom exercises, case studies, group discussions among the students and projects aimed at solving real life problems. The lecture material will be availed to the students in advance to enable them have prior reading. Solving real life problems in each theme or a number of topics will enhance the students' understanding of the problem based learning techniques.

Assessment method

Assessment will be done through coursework which will include assignments, class room and take home tests, project work and presentations and a written examination. Course work will carry a total of 40% and written examination carries 60%. Coursework marks will be divided into; Assignments 5%, Tests 10% and Practical/project Work 25%.

References:

1. Meredith, J.R. and Mantel, S.J. 2009, Project management: a managerial approach. 7th edition./ Wiley.
2. Jack Gido and James P. *Clements Successful Project Management* An International Thompson Publishing Company ISBM 0-538-88152-6
3. Frederick L. Harrison, Dennis Lock, *Advanced Project Management: A Structured Approach,* Gower Publishing, Ltd., ISBN 0566078228, 2003
4. Scott Berkun, *The Art of Project Management*, O'Reilly, ISBN 0596007868, 2005.
5. Harrold Kerzner. *Project management. A systems Approach to Planning, Building, Scheduling and Planning.* 10th Edition. John Wiley & Sons.
6. Project Management Institute. 2004. *A Guide to the Project Management Body of Knowledge.*
7. David I. Cleland, Ronald Gareis. *Global Project Management Handbook. Planiing, Organizing and Controlling International Projects.* 2006. McGraw Hill.