



UNIVERSITY *of* LIMERICK
OLLSCOIL LUIMNIGH

CE4058

Lecture I

Construction Project Management

Syllabus



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Course Description

- As technological integration and construction complexity increase, so do construction lead times. To stay competitive companies have sought to shorten the construction times by better management of construction efforts
- In this course, three important aspects of construction project management are taught:
 - The theory, methods and quantitative tools used to effectively plan, organize, and control construction projects;
 - Efficient management methods revealed through practice and research;
 - Hands-on, practical project management knowledge
- To achieve this, we will use a basic project management framework in which the project life-cycle is broken into organizing, planning, monitoring, controlling and learning from old and current construction projects
- Within the framework, you will learn the methodologies and tools necessary for each aspect of the process as well as the theories upon which these are built
- If you engage, by the end of the semester you will be able to adapt and apply the framework to effectively manage a construction project in an Architecture/Engineering/Construction (A/E/C) organization



Project Management Phase

Introduction

Project Management and Manager

FEASIBILITY

STRUCTURE

PLANNING

DEVELOPMENT

CONTROL

CLOSEOUT



Section 1: Project Feasibility

- **Project organization involves evaluating possible projects, selecting contracting type, including a payment scheme, selection method, and delivery type**
- **We will be covering both qualitative issues (such as discussion of financing mechanisms) in addition to quantitative methods for comparing and valuing projects, such as discounted cash flow, cost-benefit analysis, cost-effectiveness**
- **We will be discussing the tradeoffs involved in different contract mechanisms, such as delivery types, and payment schemes, particularly looking at the incentive issues. A follow-on to choosing a delivery type is the selection of an appropriate project organization-structure and establishing the organizational breakdown structure (OBS) for the project. Through an analysis of the project information-transfer needs (i.e., who needs information from whom), project teams and a reporting structure may be determined. A critical issue of this phase of the project is the handling of uncertainty and risk in projects.**



Section 2: Project Structure

- **Project structure involves establishing the work breakdown structure and mapping this structure to the established OBS**
- **Furthermore, a project budget and cost breakdown structure are developed and mapped to the OBS and WBS. The planning phase also includes establishing an appropriate timeline for the project in the context of resource constraints. Finally, the project manager must acknowledge that very few (if any) of the estimates and predictions at hand will prove to be accurate in the future; he/she needs to account for risk factors and their possible consequences on the schedule, budget, quality and environment while planning a project.**
- **Specific methodologies for planning include:**
 - The critical path method (CPM)
 - The precedence diagramming method (PDM)
 - The program evaluation and review technique (PERT)
 - The graphical evaluation and review technique (GERT)
 - Queue - graphical evaluation and review technique (Q-GERT)
 - Simulation language for alternative modeling (SLAM)
 - Dynamic planning and control methodology (DPM)
 - Critical chain planning



Section 3: Project Planning

- The project manager must acknowledge that very few (if any) of the estimates and predictions at hand will prove to be accurate in the future; he/she needs to account for risk factors and their possible consequences on the schedule, budget, quality and environment while planning a project.
- Specific methodologies for planning include:
 - The critical path method (CPM)
 - The precedence diagramming method (PDM)
 - The program evaluation and review technique (PERT)
 - The graphical evaluation and review technique (GERT)
 - Queue - graphical evaluation and review technique (Q-GERT)
 - Simulation language for alternative modeling (SLAM)
 - Dynamic planning and control methodology (DPM)
 - Critical chain planning
- Resource loading
- Many software tools, such as Microsoft® Project, are available to the project manager for deterministic and probabilistic planning
- We assume proficiency in Microsoft Project



Sections 4: Project Development

- **Project Monitoring refers to the configuration and metrics used to monitor the progress of a project throughout its life. Particular questions of interest to the project manager are:**
- **Is the project progressing according to the schedule?**
- **Will the project be completed within the allocated budget?**
- **Will the product perform as expected?**
- **If there are any deviations in schedule, budget or quality, how efficiently and how fast are they captured, reported and acted upon?**



Sections 5: Project Control

- **Earned Value Analysis is one project management tool used to help answer these questions. Reports are based on the organization and reporting structure established previously.**
- **Based on the information gathered through the project monitoring system, corrective action may be required to keep a project on track. The project control section of the course describes techniques to help realign projects that have gone awry. Corrective action may be needed in many areas such as project scope, product performance, project schedule, and project budget. Project control also requires a clear trace as to when and how changes are made to baselines as well as a clear understanding and documentation of project configurations.**



Section 6: Project Closeout

- **Project learning is recognised by organizations as one of the most important factors for success in current and future projects. Through life-cycle and post-mortem analysis, the project manager may identify areas to be emphasized or more closely managed in future projects. Such areas include:**
 - **Resource allocation**
 - **Risk and uncertainty**
 - **Budget constraints**
 - **Project feasibility**
 - **Change management**



Lecturer Bias

- **Qualifications**
 - **BSc (honours) Physics**
 - **MEng Material Processing**
 - **PhD Optical Communications**

- **Project Management Experience**
 - **Design Development and Deployment of Infrastructure**
 - **Test facility Design, Build and Operation**
 - **Sustainability in Built Environment**
 - **Refurbishment of Heritage Buildings**
 - **Commercial Management**
 - **15 working in United States of America**



Project Attendance

- **Project work will be assessed on a weekly basis with each student**
- **Assessment will be carried out during regular class discussions with individual students**
- **Project will be graded against**
 - **Completeness of each project element**
 - **Project detail**
 - **Participation in the weekly project exercise**
 - **Ability to answer questions around your plan**
 - **Ability to include lessons from class into project**
 - **Ability to apply skills to other areas**
- **Failure to attend will result in no marks for Project Work being awarded**
- **All grades will be provided at the end of the year through official channels**



Academic Honesty

- **The MST Department adheres to the strictest standards of academic honesty. An important aspect of achieving these standards is to be sure that students are aware of faculty expectations regarding academic honesty. This statement is an attempt to clarify these expectations as they apply to this course.**
- **Projects and Quizzes**
 - **Projects and Quizzes performed by students for submission serve the following two purposes:**
 - Are seen as educational devices to help students master the course material. This includes the concepts, theories, methodologies, and tools presented in class and recitation as well as such skills as working in teams.
 - Help the faculty evaluate how well each student has mastered the course material
 - **Thus, policies regarding academic honesty are intended to balance these two purposes and, unless otherwise stated, apply to all assignments**
 - **Students taking this class can work together to conceptualize general approaches to assignments. However, unless otherwise specified for a particular assignment, the work you submit must be done completely on your own. This includes text, numerical calculations, mathematical derivations, diagrams, graphs, computer programs and output. You are also expected to properly reference the source of any information used in a submission that is not your own. This includes any book, article, Web page, presentation or personal correspondence that you used for your work.**
 - **It is also inappropriate to use assignments, problem sets or projects submitted in previous years as a source, unless otherwise indicated.**
- **If you have any questions about how these policies relate to a specific situation, please speak to the teaching staff of this course for clarification**



Assessment

- **50 % Project Work: (examples)**
 - Write a project Specification
 - Analyse Project Costs
 - Build a WBS, CBS and OBS
 - Develop a Project Plan
 - Develop a reporting Structure
 - Perform a risk analysis

- **50% Semester Examination**
 - One (1) Project
 - Six (6) questions,
 - Answer all six (6)
 - Two and half (2.5) hours



Repeats

- **100% Semester Examination**
 - **One (1) Project**
 - **Six (6) questions,**
 - **Answer all six (6)**
 - **Two and half (2.5) hours**



Exam Advice

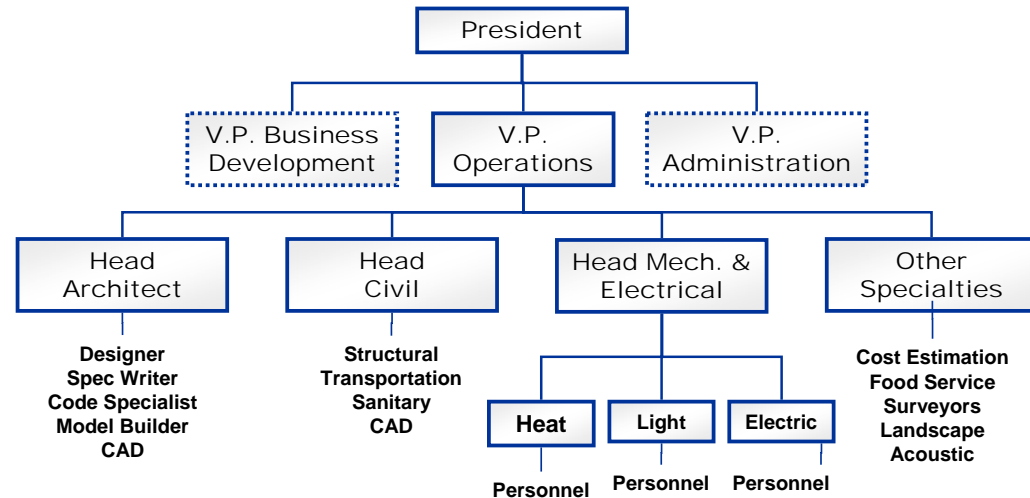
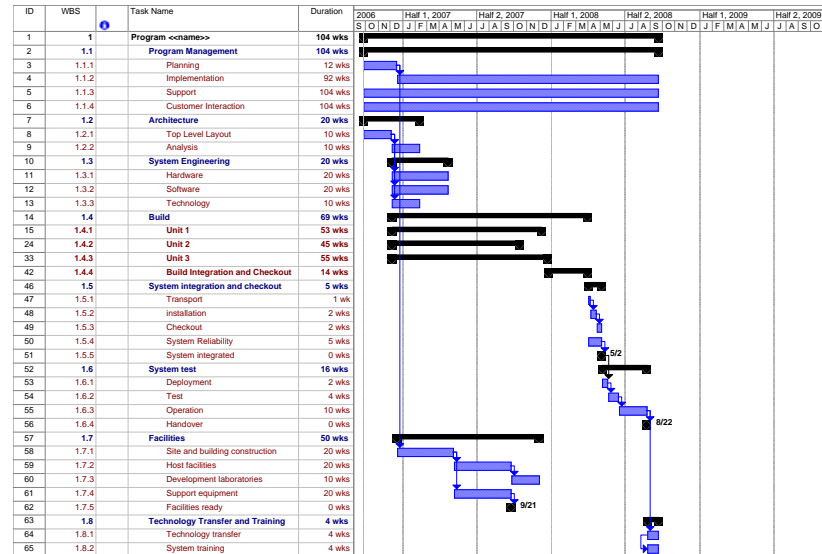
- **The final exam will see the student develop a complete plan for a particular project**
- **The project will be different from any discussed in class**
- **The student will be asked to**
 - **Assess project feasibility**
 - **Structure a project**
 - **Develop a project plan**
 - **Establish change management strategies**
 - **Establish control strategies**
 - **Establish closeout strategies**
- **Every aspect of the notes provided must be considered in the final plan**
- **It is unlikely that a student that fails to attend the weekly class will pass the course**
- **Aide Memoir (I will consider student input)**
 - **Each student will be given a completed Aide Memoir sheet.**
 - **Students will see a final copy of the sheet by week 4**
 - **A fresh copy with the exam paper**
 - **Students can NOT bring any material into the exam**



Aide Memoir Front



WBS	Attribute	People	Material
1	Program <<name>>		
1.1	Program Management		
1.1.1	Planning		
1.1.2	Implementation		
1.1.3	Support		
1.1.4	Customer Interaction		
1.2	Architecture		
1.2.1	Top Level Layout		
1.2.2	Analysis		
1.3	System Engineering		
1.3.1	Hardware		
1.3.2	Software		
1.3.3	Technology		
1.4	Build		
1.4.1	Unit 1		
1.4.2	Unit 2		
1.4.3	Unit 3		
1.4.4	Build Integration and Checkout		
1.4.4.1	Integrate units		
1.4.4.2	Checkout build		
1.4.4.3	Build release		
1.5	System integration and checkout		
1.5.1	Transport		
1.5.2	Installation		



Next Topic

