

# E-Business in Construction

## Course Objectives:

This course will review the various technologies available for the construction manager to improve work flow processes. Specifically studied will be the benefits of collaboration systems that function through the internet and allow a company to communicate with various team members more efficiently. The student will be given a brief synopsis of the technology that has evolved in the past ten years, along with case studies of recent testimonials from teams using these leading systems to manage projects. The concepts of collaboration, online bidding, e-commerce, and estimating will be covered, along with a brief overview of estimating and coordinating from modeling (BIM) technologies. We shall also cover the basics of writing a research paper, which includes determining a theme, forming an outline, research techniques, and formulating a conclusion.

Following is a week-by-week description of the course:

### **Week 1: An Introduction to the World of Extranets**

An Extranet or “limited access internet” is a design and construction team’s centralized data communication structure. Over the last few years this tool has evolved into something that everyone on the construction team will be able to use. The users include the owner’s representative, project architect, general contractor, project manager, mechanical engineer, subcontractors, and consultants. These systems have been tested to extend into material procurement transactions and e-commerce.

Collaboration methodologies: Using web-based work flow to improve communication, Extranet terminology and e-commerce concepts will be covered. Techniques and various systems used for team communication of project information will be reviewed. A lecture with a hands-on session in the MPM computer lab is included. A comparison of the various tools and features will be studied, and assigned readings and case studies will be discussed.

### **Week 2: Fundamentals of Project Controls**

Techniques using technology to manage controls for projects (from pre-bid to close-out) to reduce printing and delivery costs will be presented. Electronic responses to estimates, questions, requests for information, and on-line detail drawing reviews will be discussed. Communication techniques using on-line software and database methodology will allow questions to be answered and issues to be resolved before they grow into costly delays. This will allow buildings to be constructed ahead of schedule and with increased responsiveness to owner and subcontractor requests. It will also improve the efficiency of our business, just as the fax machine did.

**Week 3: Building Information Modeling: Effects on Construction Management**

Cost estimating techniques are used to perform automated quantity take-offs. Software extraction techniques are used to streamline the costing process. Modelling can be used to perform clash analysis and interference checking prior to fabrication. “What if” studies and 4D scheduling are used to identify early conflict resolution through improved visualization of the construction process.

**Week 4: Trend Toward Standardizing on Web-based Collaboration – On-line Class**

Following an overview of web-based project management in construction (i.e., electronic bidding, procurement, etc.) and the benefits of web-based collaboration, the systems used will be discussed and the use of the Prolog Website will be demonstrated.

**Week 5: Financial Management Concepts with Prolog Manager – On-line Class**

Define the components and business objectives of financial management. Identify the principles supporting cost forecasting and change management that are critical to producing an Anticipated Cost Report (ACR). Identify the principles that flow from cost forecasting and are critical to supporting profit forecasting and producing a Project Profitability Analysis. Review the linkages among cost forecasting, profit forecasting, and the reported financial results of a company. Demonstrate a sample ACR that is produced via Prolog Manager shared with a client.

**Week 6: Online Bidding Communities- Guest Lecture**

The benefits and features of on-line bidding tools and plan rooms will be reviewed. The system allows users to organize their projects on-line, manage their preferred subcontractor’s qualifications, and access GradeBeam’s directory of updated subcontractor and supplier information. A demonstration will illustrate how GradeBeam’s messaging tools enable users to efficiently send private notices via fax and e-mail within minutes, allowing subcontractors to view project information, print documents, respond to invitations, and order plans on-line. GradeBeam will be compared to other on-line tools.

**Week 7: Portals Strategies – Guest Lecture**

The evolution of information navigation will be presented, together with an overview of Portal (definition, types, and features). Key issues and benefits for business portals will be discussed. The new generation Web 2.0: What is it? Where is it going? Enterprise Content Management (ECM) and Business Management (BPM) will be defined and how they fit with portal strategies will be explained and demonstrated with live examples.

**Week 8: Research Paper**

Good research is well organized and requires journalistic purity. This class will cover examples of well written papers and how the students should go about researching, interviewing, and documenting testimony from construction industry champions. Basic outlines, themes, citations, references, and conclusions will be covered.

**Week 9: Techniques for Conducting In-depth Research**

Uncovering the truth about how teams really use technology requires in-depth exploration. This session will present the “tricks of the trade for researching” from the best in the business. The authors and editors of Constructech, Engineer News Record, and Crane’s Chicago Business News (Technology Corner) will share their trade secrets on how research is accomplished.

**Week 10: Industry Trends and World Perspectives – The Mobile Office**

Construction management and design teams need to be acutely aware of problems in the field. Solving problems quickly is being increasingly expected by sophisticated owners. The technology behind mobile offices and the techniques used around the world will be compared. The newest Long Term Evolution (LTE) infrastructure, wimax, wireless broadband, and EV-DO (3G and 4G wireless) will be compared, along with the basics in hot spot detection and satellite linkages. An inspection of a live prototype office will be conducted.

**Exam Week:** Students will present the results of a research paper that they have prepared during the quarter.

**Text:** On-line papers from Stanford Center for Integrated Facility Engineering (CIFE), Harvard Graduate School of Design (GSD), Georgia Tech, MIT, and the archives of on-line articles of the past ten years will be used as class reading materials.

**Software:** D-Profiler, Prolog Manager/Project Talk version 2008 by Meridian, Plansandspecs, GradeBeam, Constructware, Procure, E-builder, Buzzsaw, and Excel

**Grade Determination:**

Mid-term examination	15%
Final examination	20%
Homework/research	25%
Class participation	25%
Case study paper	15%