



# **COURSE INTRODUCTION**

**CEM 549**

## **Construction Management Information Systems (CEM 549)**

**BY**

**MOHAMMED JALALUDDIN**

**LECTURER**

**CONSTRUCTION ENGINEERING & MANAGEMENT DEPT**

**SEPTEMBER 9/2006**



# CEM 549 Overview

- Syllabus
- Course description
- Course objectives
- Text
- Software
- Contact information
- Course Website
- Grading plan
- Class participation / feedback
- Term projects
- Examinations

# ABOUT ME



## Mr. Mohammed Jalaluddin Construction Management Information Systems (CEM 549)

### Contact Information & Class Timings

<b>INSTRUCTOR:</b>	Mr. Mohammed Jalaluddin 860-1623 (Day) 860-5221 (Evening) Email: <a href="mailto:jalals@kfupm.edu.sa">jalals@kfupm.edu.sa</a>
<b>OFFICE HOURS:</b>	Office at 331 Building 19 Saturday 12:30 P.M. – 2:30 P.M. Monday 12:30 P.M. – 2:30 P.M. After class and by appointment
<b>TIME &amp; PLACE:</b>	Saturday and Monday 8:00 - 9:15 PM Room 450 Building 19.



# AGENDA

## CEM 549: Construction Management Information Systems

1. What are the aims & objectives of the course
2. What will be covered in this course?
3. What is the importance of this course ?
4. What is expected to be successful in course?

# Text



- *There are no required textbooks*
- *Class Notes and Handouts*
- *Course material will be made available through the **WEBCT** web site.*

# TIMBERLINE OFFICE



## Software –

- Timberline
- Primavera
- BSD Perspective Specification software
- Expedition
- Contract Document :EF
- Excel/MS Access/SQL

PEWin - C:\Database\Preconstruction DB\Composite Preconstruction Database

Office Building

Group	Description	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
20000.00	TRADE GENERAL REQ'MNTS	677,694	27,557	262,782	54,144	58,591	980,768
20500.00	DEMOLITION	166,134	5,254		107,112		278,501
21000.00	SITE PREPARATION	8,258			5,719		13,977
21500.00	EARTHWORK	690,147	19,744		599,292		1,309,183
23000.00	PAVING AND SURF						
23500.00	SITE UTILITIES						
24000.00	SITE IMPROVEME						
24500.00	CONCRETE						
25000.00	UNIT MASONRY						
25500.00	STONE						
26500.00	STRUCTURAL STI						
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29500.00	ROUGH CARPENT						
31000.00	FINISH CARPENT						
31500.00	ARCHITECTURAL						
32000.00	WATERPROOFING						
32500.00	INSULATION						
33000.00	EIFS SYSTEMS						

Office Building - Totals

Description	Amount	Cuts/Adds	Net Amount	Totals	Rate
Labor	8,100,847		8,100,847		26,952.684 ch
Material	9,382,651		9,382,651		
Subcontract	269,812		269,812		
Equipment	2,564,540		2,564,540		18,113.644 ch
Other	58,591		58,591		
	26,376,441		26,376,441		

Primavera Project Planner - [APEX]

Plant Expansion & Modernization

+ Office Building Addition

Activity	Resource	Rem Dur	Early Finish	Total	Budgeted Cost
		147	25APR05	58	947,163.00

Robotics Automation System

Andy Mason - Director of Development

Design and Engineering Phase

Activity	Resource	Rem Dur	Early Finish	Total	Budgeted Cost
AS216	ATM ENG	5	01OCT04	174	1,760.00

Tom Mills - Director of Hardware Engineering

System Integration Phase I

Activity	Resource	Rem Dur	Early Finish	Total	Budgeted Cost
AS310	FLD ENG3	2	28SEP04	155	680.00
AS315	ELECTRCN	24	01NOV04	155	12,268.00
AS103	FLD ENG1, HWSPEC	18	22OCT04	161	4,824.00
AS104	PLUMBER	13	03NOV04	161	3,432.00
AS105	FLD ENG1, HWSPEC, ELECTRCN	20	01DEC04	155	12,760.00
AS106	FLD ENG2, HWSPEC	18	28DEC04	155	4,104.00
AS107	HWSPEC, FLD ENG3	30	09FEB05	155	8,160.00

Schedule Target Comparison

GOAL

AS104.dwg

Site Preparation

Install Electrical Power

Install Robot Base

Run Sealant, Air, and Water Piping

Install Temperature Control Equipment

Set & Connect Robots

Install System Components

Resource Profile/Table

Resources: FLD ENG1

Schedule by Project & Phase Spec

Six-Month Lookahead

AIA Contract Documents: Electronic Format 3.0

PRIMAVERA

# Expedition

Complete Project Control



Microsoft Office XP

This product is licensed to:

ITC|ACS  
KFLUPM  
54185-640-000025-17148

Copyright © Microsoft Corporation 1985-2001.  
All rights reserved. This program is protected by US and international copyright laws as described in Help About.



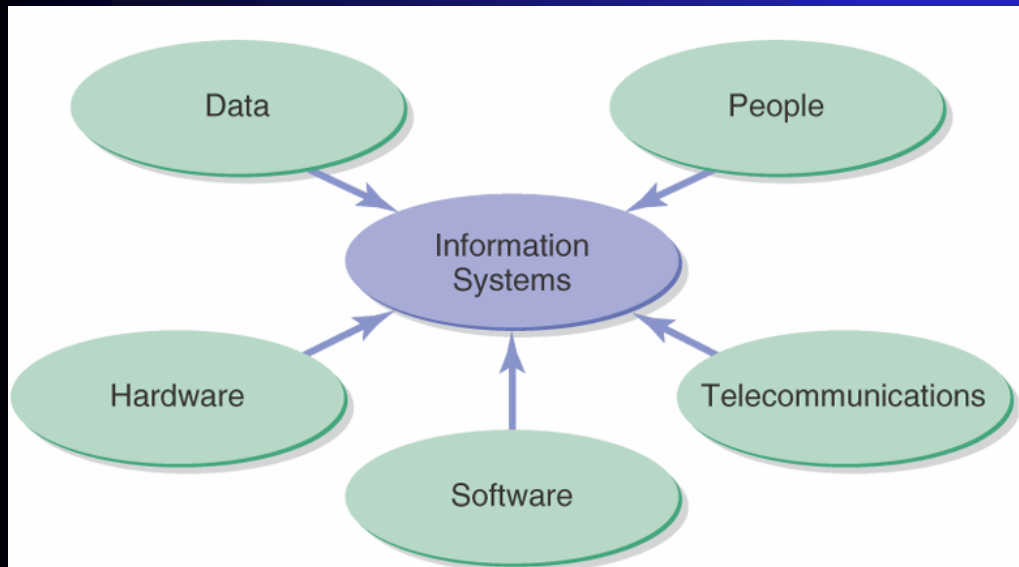
# Course Aims & Objectives

- At the completion of this course, the student will:
  - To provide an overview of the information systems and computer tools and their role in the field of construction
  - To provide an Understanding of the basic concepts of IT. identify, describe, and discuss the types of Information systems in general.
  - To provide knowledge of computer application in construction Estimation, Planning & Scheduling, in contract administration, specification etc
  - To study and practice the Computerized Information system development process through an application development term project and to survey available options for developing computer solutions to civil engineering problems
  - To gain an understanding of the Future directions in computerized construction Systems such as e-construction, e-procurement, virtual realty etc

# Course Organization:

The course is divided into major subject areas:

## **PART - A: Design of computerized Management Information System**



Definition of Information system  
Key Components of Information system

History of Information Systems

Major Types of Information systems:

Transaction Processing systems (TPS)

Management information systems (MIS),

Decision Support Systems (DSS),  
Executive Support Systems (ESS),  
Expert Systems etc

Systems from a functional perspective



# Course Organization:

The course is divided into major subject areas:

## PART - A: Design of computerized Management Information System

<p><b>Consult Mode</b></p> <p>Load Knowledgebase          Volunteer Data          Start Query          Examine Conclusions          Continue          What if          Reset Data          Load / save data          Exit System</p>	<p><b>How</b></p> <p>proposed scraper is tandem scraper          was derived from          rule 6          if mass excavation is yes          and maneuverability is adequate          and rock sizes in the band "30-45" cm          or "&lt; 30 cm"          and underfoot conditions in the excavating          area are good or bad          and underfoot conditions in the hauling area          are good or bad          and the underfoot conditions in the dumping          area are bad          then proposed scraper is tandem scraper</p>
<p><b>Command</b></p>	

Esc proceed || F2 print || C chart || Cursor Keys scroll display ||

Design of Computer Based Information Systems  
 Overview of Decision Support Systems (DSS),  
 Characteristics of DSS  
 Comparison of DSS and MIS,  
 Components of DSS  
 MIS, components, characteristics  
 Input/Output  
 Management information systems (MIS),

# PART - B: Information Technology and Construction Industry

PRIMAVERA  
Teamplayer Print Preferences Help Logout

Resources Projects Portfolios BuildId: 08-28-01 17:00

View: Activity List for Project Office Building Addition ae [Add activities to project](#)  
[Customize this page](#)

Search by Activity Name containing

Activity Name	Start Date	Finish Date	Remaining Duration	Percent Complete	Primary Resource	Mark as Completed
Design Building Addition **blshh**	Jul/19/99	Aug/28/99	0.00m	100.00%		<input checked="" type="checkbox"/>
Define System Requirements	Jul/20/99	Aug/3/99	0.00m	100.00%	tong2	<input checked="" type="checkbox"/>
System Design	Aug/2/99	Aug/27/99	0.00m	100.00%	adsfgdfg	<input checked="" type="checkbox"/>
Prepare Drawings for Temp Control Equipment	Aug/18/99	Aug/27/99	0.00m	100.00%	rsrs15	<input checked="" type="checkbox"/>
Prepare Drawings for System Controller	Aug/18/99	Aug/25/99	0.00m	100.00%		<input checked="" type="checkbox"/>
Approve System Design	Aug/30/99	Sep/1/099	0.00m	100.00%		<input checked="" type="checkbox"/>
Review and Approve Designs	Aug/30/99	Sep/21/99	0.00m	100.00%		<input checked="" type="checkbox"/>
Review and Approve Temp Control Equipment	Aug/30/99		0.00m	100.00%		<input checked="" type="checkbox"/>
Assemble Brick Samples	Sep/20/99	Sep/25/99	0.00m	100.00%		<input checked="" type="checkbox"/>
Begin Building Construction	Sep/20/99	Sep/20/99	0.00m	?	Power Generation Division	<input checked="" type="checkbox"/>

1 to 10 of 170 [Next 10 >>](#)

PRIMAVERA  
Teamplayer Print Preferences Help Logout

Resources Projects Portfolios BuildId: 08-28-01 17:00

View: Executive Summary

Organize By  
hydra-conveyer-auto

Legend: Critical Warning Acceptable Exceptional

hydra-conveyer-auto Summary Date: Jul/11/01

**The projects are complete. It is -18,909\$ or over budget and -8.26m or -0.35% ahead of schedule.**  
If current trends continue, at project completion:

- The finish date will be Dec/22/00 or 0.01m late.
- The total cost will be between (on budget) and or on budget

Automated System Summary Date: Jul/11/01

**The project is 0.36% complete. It is \$ 3,195 or 0.03% under budget and 0.56m or -0.07% ahead of schedule.**  
If current trends continue, at project completion:

- The finish date will be Mar/30/00.
- The total cost will be between \$ 101,761 or 0.10% over budget and \$ 93,332 (0.01% over budget).

Conveyor System Summary Date: Jul/11/01

**The project is 0.51% complete. It is -22,1631 or -0.51% over budget and -7.70m or -0.51% ahead of schedule.**

1 to 2 of 2

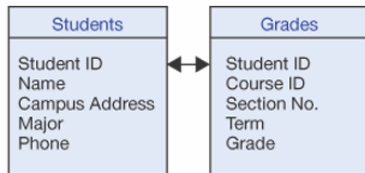
- ✓ Case Studies
- ✓ Overview of the Emerging Computer applications in construction industry:
- ✓ Computer applications in Planning & scheduling,
- ✓ Computer applications in construction Estimation
- ✓ Computer applications in contract administration and specification etc.

# Course Organization:

The course is divided into major subject areas:

## PART - C: Information and Databases

**Figure 3.9** The attributes for and links between two entities—students and grades.



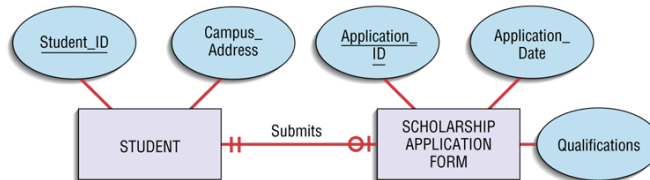
**Students**

Student ID	Name	Campus Address	Major	Phone
555-39-3232	Joe Jones	123 Any Avenue	Finance	335-2211
289-42-8776	Sally Carter	1200 Wolf Street #12	Marketing	335-8702

**Grades**

Student ID	Course
555-39-3232	MIS 25
555-39-3232	MIS 25
289-42-8776	MIS 25

**Figure 9.19a** Possible Denormalization Situations —  
Two Entities with a One-to-One Relationship



Normalized relations:

STUDENT(Student\_ID, Campus\_Address, Application\_ID)  
APPLICATION(Application\_ID, Application\_Date, Qualifications, Student\_ID)

Denormalized relation:

STUDENT(Student\_ID, Campus\_Address, Application\_Date, Qualifications)

and Application\_Date and Qualifications may be null

(Note: We assume Application\_ID is not necessary when all fields are stored in one record, but this field can be included if it is required application data.)

Information and Database

- Data Management
  - Data Modeling and Database Models
  - Database Management systems, Entity-Relationships
- "DBMS in Construction Industry, Case studies"



# PART - D: Computer application in estimating, planning and scheduling, etc

## TIMBERLINE OFFICE

PEWin - C:\Database\Preconstruction DB\Composite Preconstruction Database

File Edit View Database Takeoff Pricing Reports Interface Window Help

Office Building

Group	Description	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
20000.00	TRADE GENERAL REQ'MNTS	577,694	27,557	262,782	54,144	58,591	980,768
20500.00	DEMOLITION	166,134	5,254		107,112		278,501
21000.00	SITE PREPARATION	8,258			5,719		13,977
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Office Building - Totals

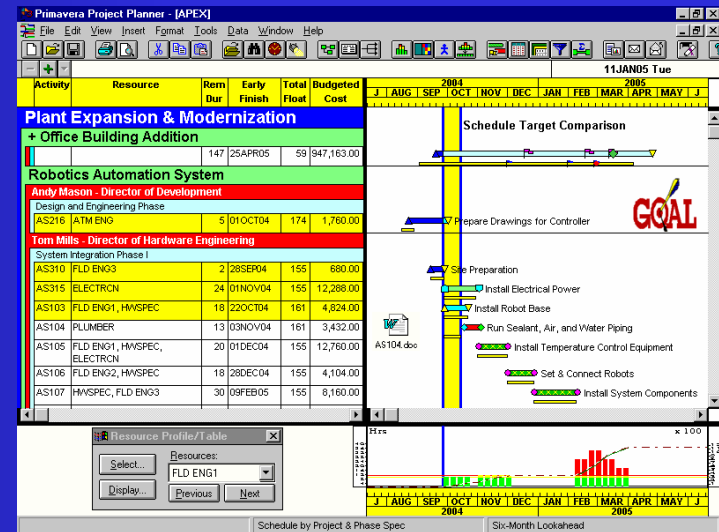
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Subcontract	269,812		269,812		
Equipment	2,584,540		2,584,540		18,113.644 ch
Other	58,591		58,591		
	<b>20,376,441</b>		<b>20,376,441</b>	<b>20,376,441</b>	
Estimate Contingency	1,018,822				5.000 %
<b>Total</b>				<b>21,395,263</b>	

Phase Item Takeoff Order

Spread Variance Clear Variance [OK] [Cancel] [Help]

For Help, press F1

Hands on sessions with computer software such as Timberline, Primavera, Computer applications in contract administration, specification etc. This part will have lab exercise and computer lab





# PART - D: Computer application in estimating, planning and scheduling, etc

## TIMBERLINE OFFICE

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File Edit View Database Takeoff Pricing Reports Interface Window Help

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Other	58,591		58,591		
	<b>20,376,441</b>		<b>20,376,441</b>	<b>20,376,441</b>	
Estimate Contingency	1,018,822				5.000 %
<b>Total</b>				<b>21,395,263</b>	

Phase Item Takeoff Order

Spread Variance Clear Variance

For Help, press F1

TIMBERLINE 7.1 2004 is a computerized cost estimating software package for building estimates for construction projects. It has a comprehensive package of cutting-edge estimating tools. Timberline Estimating Standard makes it easy to create, analyze and fine-tune your estimates. This course focuses on creating new estimates using Timberline software, takeoff methods (quick, item and assembly), modifying estimates, graphical reporting and database development. This course teaches you how to set up resources, crews, labor and equipment rate tables. WBS codes, WBS libraries and estimate adjustments A comprehensive workbook and duplicate files of course work are provided for future reference. Hands-on computer lab time combined with lecture will ensure a good foundation for the software.

### COURSE OUTLINE

The following topics are thoroughly covered in this course:

- Review of fundamentals in cost aspects of construction,
- Introduction to TIMBERLINE 7.1 2004 and basic fundamentals of computerized estimating
- Setting Up an Estimate & Performing Quick Takeoff (Setting Up a New Estimate, Building Your Estimate, Working with the Spreadsheet)
- Performing Item Takeoff & Working with Estimate Tools ( Assembly Takeoff, Using Assembly Takeoff Building More Assemblies)
- Manipulating Estimates and Creating Reports (Revising Your Estimate, Working with Your Estimate, Printing Reports, Experimenting with Report Options)
- Database structure and customization (Setting Up the Database, Creating Phases and Addons)

# PART - E: Future directions in computerized construction systems



*eConstruct*



Overview of E-Construction, e-Procurement, Project Websites-Tendering

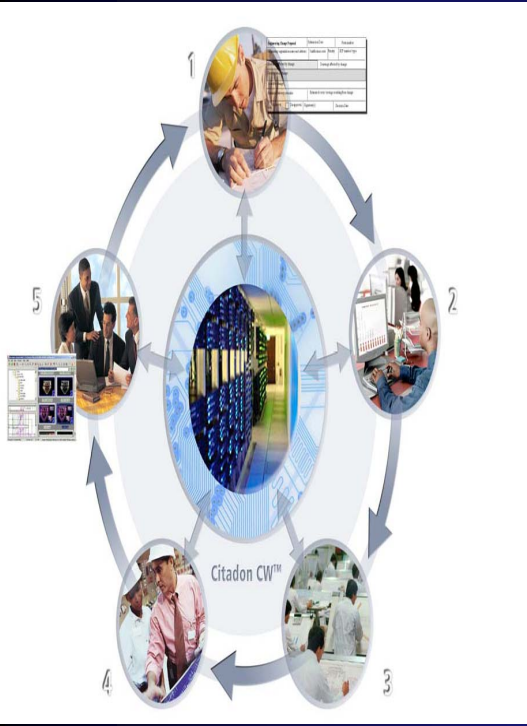
Project Collaboration, Extranets, Building Information Modeling, Integrated building models, Integrated project databases and Integrated Teams, e-project management, Virtual reality etc



# PART - E: E-commerce /E-construction

E-construction for the architecture/ engineering/ construction industry  
 Internet-enabled e-construction processes and systems

E-construction technologies investigated include Web and Internet fundamentals, Web portals, .



ProjectNet: On-Demand Project Collaboration Management

- ▶ Improve team communication
- ▶ Maximize profits
- ▶ Minimize risk

**Citadon**  
 Projects Processes Documents Teams

# PART E: Virtual Reality Application in Construction

Virtual Reality application in Construction

VR Features  
VRML  
VRML structure  
Case Studies







# Attendance and Participation:

## Attendance and Participation:

Regular class attendance is compulsory and **missing classes** will lower the component of the grade. Students are expected to attend all lectures, participate in the class discussion and submit all assignments on time.

## Article Presentation:

Each student will present and prepare summary of journal article related to computer application in construction. With the approval of the instructor, the student will choose the journal article. Specific requirements will be distributed and discussed in class later.



# Term Project:

## PART F: Term Project:

With the approval of the instructor, the student will work on term project. The term projects will involve an application analysis and design. Specific term project requirements will be distributed and discussed in class later

# GRADING

- Grading policy for this course will be based on the following table.

Article Presentation	5 %
Midterm	30 %
Term Project	30%
Final Exam	35%



# SCHEDULE

Week	Date	Lecture	Remarks
1	Sept-6 (W)	Course Registration & Confirmation	
	Sept-9 (S)	Course Introduction	
	Sept-11 (M)	Definition of Information system, Key Components of Information system Major Types of Information systems, TPS, DSS, Expert Systems etc	
2	Sept-16 (S)	Design of Computer Based Information Systems	
	Sept-18 (M)	Overview of DSS, MIS, components, characteristics, Input/Output	
3	Sept-23 (S)	Information and Database	
	Sept-25 (M)	<ul style="list-style-type: none"> <li>Data Management</li> </ul>	
		<ul style="list-style-type: none"> <li>Data Modelling and Database Models</li> <li>Database Management systems, Entity-Relationships</li> </ul>	
		DBMS in Construction Industry, Case studies	
4	Sept 30 (S)	Spreadsheet Programming	Submit Article Topic
	Oct-2 (M)	Excel Handon Lab sessions	Discuss Term Project
		Advance Features of Excel	
		Excel Solver Database Functions within excel	

# SCHEDULE

# contd



<b>5</b>	Oct-7(S)	Overview of Systems Development Lifecycle	
	Oct-9 (M)	System Design ,	
		Systems Implementation	
		System Maintenance and Review	
Oct 12- 27		Id al-Fitr Vacation	
<b>6</b>	Oct-28 (S)	MAJOR	MAJOR
	Oct-30 (M)	Article Presentation	Article Presentation
<b>7</b>	Nov -4 (S)	Article Presentation	
	Nov -6 (M)	Article Presentation	
<b>8</b>	Nov-11(S)	Hands on sessions with computer software:Timberline,	
	Nov-13(M)	Introduction to TIMBERLINE 7.1 2004 and basic fundamentals	
<b>9</b>	Nov-18(S)	Setting Up an Estimate & Performing Quick Takeoff	Timberline
	Nov-20(M)	Setting Up a New Estimate, Building Your Estimate, Working with the Spreadsh	
<b>10</b>			
	Nov-25(S)	Computer application in Planning & scheduling	
	Nov-27(M)	Hands on Session with Primavera software	

# contd



<b>11</b>	Dec-2(S)	Computer application in Planning & scheduling	Primavera
	Dec-4(M)	Hands on Session with Primavera software	
<b>12</b>	Dec-9(S)	Computer application in Planning & scheduling	Primavera
	Dec-11(M)	Hands on Session with Primavera software	
<b>13</b>	Dec-16(S)	Computer application in specifications, contract Management	BSD Perspective
	Dec-18(M)	Computer application in Contract documents	Expedition, AIA EF
Dec 21- 5 Jan Id Al-Adha Vacation			
<b>14</b>	Jan 6(S)	E-Construction,e-Tendering,Project Collaboration,	citadon
	Jan 8 (M)	Project websites,	
		e-project management, Virtual reality etc	
<b>15</b>	Jan -13(S)	Building Information Modeling , Integrated building models	Term Project Presentations
	Jan -15(M)	3D/4D CAD Introduction	
<b>16</b>			
	Jan -20- 3 Jan	Final Examination week	



# Summary

- This is about **YOUR** course
- Basics of Information systems concepts for Construction engineering & management
- Work with the team
- Keep up with term project submissions
- Attend classes

# THANK YOU

■ QUESTIONS

