College of Engineering

Department of Civil Engineering

CE 517 Computer Applications in Construction

Credit and Contact hours	3 / 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Required
Course Description	Microcomputer applications in construction management, planning, scheduling, cost estimate, and risk analysis. Students should also gain exposure to the use of expert systems, databases and other integrated packages.
Prerequisites or Co-requisites	None

Course Learning Outcomes	Students completing this course successfully will be able to:	

Course Learning Outcomes (CLOs)	Related Student Outcomes (SO)
CLO1. Recognize and identify the most critical issues and challenges in planning and control any construction project by using the computer application. K1	**SO1**
CLO2. Apply the new technology in the field of construction engineering and management in real-life construction projects. S1	**SO2**
CLO3. Develop and apply various Software in real-life construction projects in the field of construction engineering and Management. S1	**SO2**
CLO4. Improve students' communication skills, including reading, writing, and oral presentations. V1	**SO6**

Student Outcomes related to this Course	SO 1 Recognize advanced engineering knowledge, concepts, and techniques to identify, interpret, and analyze complex and real-life engineering problems. SO 2 Provide solutions for complex and real-life engineering problems through critical thinking and the use of modern engineering tools, and identify their impact on social, global, cultural, environmental, safety, and economic factors. SO 6 Demonstrate scientific integrity, ethical responsibility, and academic values in scientific publications, research projects, and thesis work.

	List of Topics	Related CLOs
Topics Covered	1. Course introduction, Syllabus overview, Construction Project Initiation	**CLO 1**
	2. Project Time Management: Network Diagrams: an overview for some project planning phases such as WBS, logical relationship between activities, developing project network. In addition, this lecture will present the processes of developing the project networks via MS Project and Primavera.	**CLO1**

	Critical-Path Analysis for Network Scheduling: Network Scheduling, Scheduling With Microsoft Project Software, Scheduling With P6 Software, Advanced Topics:	
	3. Project Cost Management: Project Financing and Schedule Integration: Project Cash Flow, Calculating the S-Curve, Overdraft Calculations and Interest Charges, and Using project management software to achieve these tasks.	**CLO1**
	4. Resource Allocation and Leveling: Clarifying the processes of resource leveling and allocation. Using project management software for resource leveling and allocation. Time-Cost Tradeoff: Project Time-Cost Relationship, Existing TCT Techniques and software..	**CLO 1**
	5. Construction Progress Control: Measuring Work Progress, Cost and Schedule Control, Schedule Updating, and Using project management software to achieve these tasks.	**CLO 2**
	6. Cost Estimation: this lecture will clarify some aspect related to construction estimating and discuss some estimating commercial software such as Timberline and Autodesk Quantity Takeoff.	**CLO 3**
	7. Delay Analysis: This lecture will clarify some techniques for analyzing the delays in construction projects.	**CLO 2**
	8. Risk Analysis: this lecture will present an overview for risk analysis. In addition, the lecture will explain some techniques and software for risk analysis such as AHP and Expert choice	**CLO 1**
	9. Building Information Modeling (BIM): This lecture will clarify the BIM and present some BIM tools that can be used for construction management field.	**CLO 2**
	10. Using BIM in Knowledge management Using BIM for Facility management	**CLO 3**
	11. Modeling and simulating the construction processes	**CLO 4**
	12. 3D Laser Scanners	**CLO 2**
Textbook(s) and Other Required Material	• Schwalbe, K. (2015). Information technology project management. Cengage Learning. • Hegazy, T. (2002). Computer-Based Construction Project Management: Pearson New International Edition. Pearson Higher Ed. • Paulson Jr, B. C. (1994). Computer applications in construction. McGraw-Hill, Inc. • Williams, T. (2006). Information Technologies for Construction Managers, Architects and Engineers. Thomson Delmar Learning. • Hardin, B., & McCool, D. (2015). BIM and construction management: proven tools, methods, and workflows. John Wiley & Sons • International Project Management, Academic Press, 2003, Miner Media, Eng Mgt 461, International Case Studies, Bennet Lientz and Kathryn Rea, (ISBN-0-120449985-6).	
Grading System	Participation and discussion 5% Assignments 10% Course Project 25% Mid-term exam 20% Final Exam 40%	

Instructors	Prof. Khalid Al-Gahtani
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