


College of Engineering Department of Civil Engineering		
CE 578 Value Engineering		
Credit and Contact hours	3 / 3 (Lectures), 0 (Tutorials), 0 (Laboratory)	
Required, or Elective	Required	
Course Description	<p>This course provides a comprehensive introduction to Value Engineering (VE), a proven methodology designed to enhance the value of construction projects. Students will delve into the intricacies of the VE methodology, understanding its foundational principles and its pivotal role in informed construction decision-making. As they explore real-world applications on construction projects, they'll gain hands-on experience with VE tools, specifically tailored for project-based evaluations. Beyond mere theory, students will engage in practical exercises to critically analyze projects, ensuring they achieve optimal functionality at reduced costs. By the end of the course, students will be well-equipped to apply the VE method, striking a balance between performance and economy in construction endeavors.</p>	
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: Appraising the fundamental concepts, principles, theories, and terminologies used in the field of value engineering. Selecting and assessment of value engineering projects, project selection, methods selection, value standards and application of value engineering methodology. K1	SO1
	CLO2: Applying techniques and skills in selecting products and operation for value engineering activities, and programs. Developing alternate ways to required functions, decision making for optimum alternatives, applying Monte Carlo Simulation, measuring profits, and using of advanced technique like Function Analysis System. S1	SO2
	CLO3: Applying Value Engineering methods to construction projects, building design projects. Performing of "Function Analysis" for buildings and civil projects. Applying the value engineering techniques in maintenance and repairing projects. S1	SO2
	CLO4: Planning to make a value engineering team and discussing various value engineering case studies. Investigating ways to model an answer to a value engineering problem. V2	SO7
	CLO5: Creating ethical questions regarding value engineering in the field of construction, design and maintenance projects. V1	SO6

Student Outcomes related to this Course	<p>SO 1 Recognize advanced engineering knowledge, concepts, and techniques to identify, interpret, and analyze complex and real-life engineering problems.</p> <p>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.</p> <p>SO 6 Demonstrate scientific integrity, ethical responsibility, and academic values in scientific publications, research projects, and thesis work.</p> <p>SO 7 Effectively manage, individually or in groups, specialized tasks and activities in coursework, projects, assignments, and research work with a high level of autonomy and responsibility.</p>																								
Topics Covered	<table border="1"> <thead> <tr> <th>List of Topics</th><th>Related CLOs</th></tr> </thead> <tbody> <tr> <td>1. An introduction to value engineering and a little brief about objectives and the reasons for unnecessary costs, when to apply value engineering, VE methodology and techniques, interface with other programs, demonstrated impact of VE</td><td>CLO1</td></tr> <tr> <td>2. Illustrate the project scope and budget: elements of the project budget, prevalent budgeting techniques, cost control, defining project scope, parameters and parameter cost</td><td>CLO 1</td></tr> <tr> <td>3. Expose the objectives of the capitalized income approach to project budgeting, measuring property value, meaning of capitalization, capitalization process, need for cost control</td><td>CLO2</td></tr> <tr> <td>4. Illustrate making, construction, types, and other resources of cost models.</td><td>CLO3</td></tr> <tr> <td>5. Explain planning for value engineering services; VE objectives, level of effort VE and total project management, team selection, the VE job plan</td><td>CLO1</td></tr> <tr> <td>6. Explain the function analyses: classifying function, defining functions, project level function analysis system techniques (FAST) diagram</td><td>CLO2</td></tr> <tr> <td>7. Show the creativity and interpersonal skills: creativity and fixation, interpersonal skills, human factors, creativity throughout the job plan, Delphi technique.</td><td>CLO5</td></tr> <tr> <td>8. Illustrate Life Cycle Costing as Decision Makers' Impact on LCC, LCC and Total Building Costs, LCC Terminology and Examples, LCC Methodology, Application of LCC to Buildings.</td><td>CLO1</td></tr> <tr> <td>9. Integrating VE into the construction industry, planning and design construction, maintenance and operations (M&O)</td><td>CLO3</td></tr> <tr> <td>10. VE applications to risk assessment and analysis, risk assessment, risk analysis.</td><td>CLO3</td></tr> <tr> <td>11. Case studies; case study one--corporate office building, case study two--hospital and staff housing complex, case study three--refinery facility.</td><td>CLO4</td></tr> </tbody> </table>	List of Topics	Related CLOs	1. An introduction to value engineering and a little brief about objectives and the reasons for unnecessary costs, when to apply value engineering, VE methodology and techniques, interface with other programs, demonstrated impact of VE	CLO1	2. Illustrate the project scope and budget: elements of the project budget, prevalent budgeting techniques, cost control, defining project scope, parameters and parameter cost	CLO 1	3. Expose the objectives of the capitalized income approach to project budgeting, measuring property value, meaning of capitalization, capitalization process, need for cost control	CLO2	4. Illustrate making, construction, types, and other resources of cost models.	CLO3	5. Explain planning for value engineering services; VE objectives, level of effort VE and total project management, team selection, the VE job plan	CLO1	6. Explain the function analyses: classifying function, defining functions, project level function analysis system techniques (FAST) diagram	CLO2	7. Show the creativity and interpersonal skills: creativity and fixation, interpersonal skills, human factors, creativity throughout the job plan, Delphi technique.	CLO5	8. Illustrate Life Cycle Costing as Decision Makers' Impact on LCC, LCC and Total Building Costs, LCC Terminology and Examples, LCC Methodology, Application of LCC to Buildings.	CLO1	9. Integrating VE into the construction industry, planning and design construction, maintenance and operations (M&O)	CLO3	10. VE applications to risk assessment and analysis, risk assessment, risk analysis.	CLO3	11. Case studies; case study one--corporate office building, case study two--hospital and staff housing complex, case study three--refinery facility.	CLO4
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Textbook(s) and Other Required Material	<ul style="list-style-type: none"> • Value Engineering: Practical Applications for Design, Construction, Maintenance & Operations, Alphonse Dell'Isola, R S Means Co., 1997. • Ingredients for Accurate Construction Cost Estimating, G.M. Hollander, Actual Specifying Engineer, June 26, 1974 • Techniques of Value Analysis and Engineering, D. Miles, Second Edition, McGraw-Hill, 1972. • Life Cycle Costing for Design Professionals, A.J. Dell'Isola and S.J. Kirk Second Edition, (New York: McGraw Hill, Inc., 1995). 																								

Grading System	Assignments	5%
	Lecture Attendance	5%
	Project work	30%
	Mid-term exams	20 %
Instructors	Prof. Khalid Al-Gahtani	
Date of Review	March 2025	