

Master Track Certificate (MTC) in Construction Engineering and Management (CEM)

CM1: Construction Project Delivery Systems

WEEK	ACTIVITY
01	<p>Learning Objectives: Understand the Construction Industry Classify Different Types of Construction Define a Construction Project and its Attributes</p> <p>Supplementary Reading: Construction Project Types Handout</p> <p>Homework: HW #1</p>
02	<p>Learning Objectives: Understand the Construction Project Life Cycle Differentiate Project Participants and their Roles Understand the Project Acquisition Process Understand the Elements of a Construction Contract</p> <p>Supplementary Reading: Project Life Cycle</p> <p>Homework: HW #2</p>
03	<p>Learning Objectives: Define a project delivery system Understand Different Project Delivery Methods Design – Bid – Build Pure Construction Management Construction Management @ Risk Discuss Advantages and Disadvantages of Each Delivery Method</p> <p>Supplementary Reading: Traditional Project Delivery Systems</p> <p>Homework: HW #3</p>
04	<p>Learning Objectives: Design – Build Integrated Project Delivery Discuss Advantages and Disadvantages of Each Delivery Method</p> <p>Supplementary Reading: Contemporary Project Delivery Systems</p> <p>Homework: HW #4</p>
05	<p>Learning Objectives: Understand Different Project Financial Contract Types Lump sum or Fixed Price Unit Price Cost Plus Percentage and Cost Plus Fixed Fee Guaranteed Maximum Price</p> <p>Supplementary Reading: Financial Contract Types</p> <p>Homework: HW #5</p>
06	<p>Learning Objectives: Understand Different Project Procurement Methods Competitive Bidding Negotiated Best Value</p> <p>Supplementary Reading: Construction Project Procurement Method</p> <p>Comprehensive Final Exam</p>

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CM2: Financial Accounting for Construction Projects**

WEEK	ACTIVITY
01	<p>Learning Objectives: Introduction to Construction Industry and Course Module Preparing and Analyzing Financial Statements</p> <p>Supplementary Reading: Financial Accounting Handout</p> <p>Homework: HW #1 Preparation of Financial Statements</p>
02	<p>Learning Objectives: Generally Accepted Accounting Principles (GAAP) Financial Transactions in Construction</p> <p>Supplementary Reading: GAAP Handout</p> <p>Homework: HW #2 Detailed Analysis of Income Statement</p>
03	<p>Learning Objectives: Representing Partial Completion In Construction Projects Measurement of Construction Project Revenue and Expense</p> <p>Supplementary Reading: Construction Revenue and Expense Handout</p> <p>Homework: HW #3 Revenue and Expense Accounts</p>
04	<p>Learning Objectives: Measuring Financial Status of a Construction Project The Percentage of Completion Method</p> <p>Supplementary Reading: Project Financial Status Handout</p> <p>Homework: HW #4 Construction Project Financial Status</p>
05	<p>Learning Objectives: Measures of Progress for Construction Projects Summary of Course Module</p> <p>Supplementary Reading: Measures of Progress Handout</p> <p>Comprehensive Final Exam</p>

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CM3: Construction Project Planning, Scheduling, and Control

WEEK	ACTIVITY
01	Learning Objectives: Introduction to Planning, Scheduling and Control Purposes and Importance Supplementary Reading: Planning and scheduling handout Homework: HW #1 Preparation of planning and scheduling
02	Learning Objectives: Network Scheduling Techniques Critical Path and Float Supplementary Reading: Critical Path Method Handout Homework: HW #2 Creating of Network Diagram
03	Learning Objective: Resource Loaded Schedule Supplementary Reading: Resource Leveling Handout Homework: HW #3 Resource Leveling
04	Learning Objective: Time-Cost Tradeoffs Supplementary Reading: Time-Cost Tradeoff Handout Homework: HW #4 Construction Project Financial Status
05	Learning Objectives: Measures of Construction Project Progress Earned Value Analysis Supplementary Reading: Earned Value Analysis Handout Comprehensive Final Exam

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CM4: Construction Equipment and Methods

WEEK	ACTIVITY
01	<p>Learning Objectives: Introduction to Construction Equipment and Course Module Understanding Construction Equipment Types</p> <p>Supplementary Reading: Equipment Types and Characteristics Handout</p> <p>Homework: HW #1 Selection of Earthwork Equipment</p>
02	<p>Learning Objectives: Fundamentals of Site Clearing and Finishing Engineering Principles of Dozers and Graders</p> <p>Supplementary Reading: Earthmoving Equipment Handout</p> <p>Homework: HW #2 Earthwork Production Estimation</p>
03	<p>Learning Objectives: Fundamentals of Greenfield and Brownfield Excavation Engineering Principles of Excavators and Haulers</p> <p>Supplementary Reading: Excavation Safety Handout</p> <p>Homework: HW #3 Excavator Production Factors</p>
04	<p>Learning Objectives: Introduction to Mobile and Tower Cranes Understanding Load Charts</p> <p>Supplementary Reading: Cranes and Lifting Devices Handout</p> <p>Homework: HW #4 Crane Capacity and Working Range</p>
05	<p>Learning Objectives: Economics of Construction Equipment Summary of Course Module</p> <p>Supplementary Reading: Equipment Economics Handout</p> <p>Comprehensive Final Exam</p>

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CM5: Construction Safety and Human Factors**

WEEK	ACTIVITY
01	<p>Learning Objectives: Introduction to Construction Safety and Health Fatalities and Non-Fatal Injury Statistics Definitions on Safety and Health Terms</p> <p>Supplementary Reading: Accident Statistics handout</p> <p>Homework: HW #1 Terms on Safety and Health</p>
02	<p>Learning Objective: Key OSHA Guidelines and Reporting</p> <p>Supplementary Reading: OSHA Recordkeeping Handout</p> <p>Homework: HW #2 Reporting Examples</p>
03	<p>Learning Objective: Measures of Safety Performances</p> <p>Supplementary Reading: Safety Performance Handout</p> <p>Homework: HW #3 Cross Comparison of Safety Performance</p>
04	<p>Learning Objective: Characteristics of Ergonomic Injuries in Construction Measurement of Ergonomic Risks</p> <p>Supplementary Reading: Ergonomic Risk Handout</p> <p>Homework: HW #4 Identifying Ergonomic Risks</p>
05	<p>Learning Objectives: Reduction and Prevention of Ergonomic Injuries Engineering, Administrative and Education Solutions</p> <p>Supplementary Reading: Ergonomic Program Handout</p> <p>Comprehensive Final Exam</p>

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CM6: Sustainable Construction Practices

WEEK	ACTIVITY
01	<p>Learning Objectives:</p> <ul style="list-style-type: none"> Energy and Efficiency Water Reduced Human Health Construction and Demolition Waste Development Patterns <p>Supplementary Reading: Need for Sustainable Construction Practices</p> <p>Homework: HW #1</p>
02	<p>Learning Objectives:</p> <ul style="list-style-type: none"> Sustainability Concepts and Definitions Principles and Fundamental Concepts Life cycle Phases Effect on Resources <p>Supplementary Reading: Sustainable Construction Framework</p> <p>Homework: HW #2</p>
03	<p>Learning Objectives:</p> <ul style="list-style-type: none"> Review Time Value of Money Concepts Life Cycle Cost Analysis Framework Life Cycle Cost Analysis Usefulness for Environmental Decision Making <p>Supplementary Reading: Life Cycle Cost Analysis for Construction Projects</p> <p>Homework: HW #3</p>
04	<p>Learning Objectives:</p> <ul style="list-style-type: none"> Process Model Economic Input Output Model Application for Construction Project Material Decision Making <p>Supplementary Reading: Life Cycle Analysis for Construction Projects</p> <p>Homework: HW #4</p>
05	<p>Learning Objectives:</p> <ul style="list-style-type: none"> What are green building material? Construction and Demolition Material Managing Construction and Demolition Material to Reduce Environmental Impact What criteria govern the selection of materials? What are new approaches to think about materials used in buildings? Some motivating examples for LCA... <p>Supplementary Reading: Sustainable Building Material</p> <p>Homework: HW #5</p>
06	<p>Learning Objectives:</p> <ul style="list-style-type: none"> Definition and Classification of Net Zero Energy Buildings Methods to Achieve Net Zero Energy Buildings Embodied and Operational Energy Demand Renewable Energy Technologies for Net Zero Energy Buildings <p>Supplementary Reading: Net Zero Energy Buildings</p> <p>Comprehensive Final Exam</p>