American Institute of Constructors

Constructor Certification Commission Document No. 29

Examination Specifications for the Level I (CAC) and Level II (CPC) Certification Examinations

Level I (CAC) Examination Specifications

Specification Categories with Percentages of Questions on Examination

LEVEL 1 CONSTRUCTION FUNDAMENTALS EXAMINATION		
CONSTRUCTION FUNDAMENTALS CONTENT AREA		2022 PERCENTAGE
I.	COMMUNICATION SKILLS	12.0
II.	ENGINEERING CONCEPTS	7.0
III.	MANAGEMENT CONCEPTS	9.0
IV.	MATERIALS, METHODS AND PROJECT MODELING & VISUALIZATION	10.0
V.	BIDDING AND ESTIMATING	11.0
VI.	BUDGETING, COSTS AND COST CONTROL	11.0
VII.	PLANNING, SCHEDULING & SCHEDULE CONTROL	12.0
VIII.	CONSTRUCTION SAFETY	10.0
IX.	CONSTRUCTION GEOMATICS	7.0
X.	PROJECT ADMINISTRATION	11.0
	TOTAL	100.0

I. COMMUNICATION SKILLS

A. Technical Reading and Writing
B. Verbal Communication and Listening Skills

C. Interpersonal Conflict Skills
D. Problem Solving Skills

II. ENGINEERING CONCEPTS

A. Engineering Material Properties and Testing
   1. Aggregate/Soil
   2. Concrete
   3. Masonry
   4. Steel
   5. Wood

B. Soil Mechanics
   1. Soil Composition, Types and Properties
   2. Soil Investigation Testing Methods and Soil Borings
   3. Types of Foundations
   4. Field Soil Identification Methods
   5. Volume Changes and Compaction Methods

C. Mechanics and Strength of Materials
   1. Formwork Design
   2. Beam Loads

D. MEP Concepts and Operations
   1. HVAC
   2. Electrical
   3. Plumbing
   4. Fire Suppression

III MANAGEMENT CONCEPTS

A. Contract Forms
   1. Elements of a Contract
   2. Lump Sum
   3. Unit Price
   4. Design Build
   5. Cost Plus
   6. Construction Management
   7. Alternate Delivery Methods

B. Business Entities
   1. Sole Proprietors
   2. Partnerships and Joint Ventures
   3. Corporations and LLC

C. Accounting and Financial Ratios
   1. Accounting Principles
   2. Financial Reports and Ratios

D. Management Systems
   3. Project Controls
   4. Technology
   5. Current Concepts

D. Ethics
   1. Constructor Code of Conduct
   2. Bidding, Purchasing and Professional Practice

E. Risks
   1. Risk Identification
   2. Risk Mitigation

IV. MATERIALS, METHODS AND PROJECT MODELING & VISUALIZATION

A. Construction Equipment
   1. Piling Equipment
   2. Sheet Piling, Cofferdams, Tie-backs
   3. Excavation Equipment
   4. Compaction Equipment
   5. Cranes and Lifting Equipment

B. Reading Drawings and Schedules
   1. Sitework
   2. Concrete and Forms
   3. Rebar
   4. Structural Steel
   5. Carpentry
   6. Exterior Finishes
   7. Doors and Windows
   8. Interior Finishes
   9. Mechanical Systems, Processes, and Equipment
   10. Electrical Systems, Controls, and Communications

V. BIDDING AND ESTIMATING

A. Bidding Process
   1. Bid Documents
   2. Scales
   3. Types of Specifications

4. Laws, Regulations, and Codes
5. Site Evaluation and Walk-thru
6. Insurance and Bonds
7. Value Engineering and Life cycle Costing
8. Temporary Site Layout

B. Estimates
1. Cost Breakdown Structure
2. Conceptual
3. Total Future Costs
4. Material Components
5. Equipment Productivity

C. Quantity Takeoff
1. Excavation
2. Forms, Rebar, Concrete
3. Rough Carpentry
4. Interior Finishes

VI. BUDGETING, COSTS AND COST CONTROL

A. Budgeting
1. Schedule of Values
2. Contingencies and Allowances

B. Cost Control
1. Productivity Rates, Earned Workhours
2. Unit Costs
3. Forecasts at Completion

C. Finalize Costs
1. Retainage
2. Back charges
3. Payments

D. Change Management
1. Schedule/Cost Impact
2. Change Orders
3. Resources

VII. PLANNING, SCHEDULING AND CONTROL

A. Logical Sequences of Design, Procurement and Construction
1. Work Breakdown Structure

2. Multi-Crew, Phase Durations, Activity Durations, and Effective Durations
3. Subcontractor Schedules

B. Event Times, Calculations, and Scheduling Terminology
1. Lead-time, Forward Pass, Backward Pass
2. Total Float, Free Float, ES, EF, LS, LF, Critical Path(s), Completion Time
3. Cost and Resource Loaded

C. Schedule Analysis
1. Crashing and Impact

VIII. CONSTRUCTION SAFETY

A. OSHA Administrative
1. EMR
2. General Duty Clause
3. Site Procedures, MSDS
4. Competent Person and Due Diligence

B. Standard Safety Procedures
1. Handrails
2. Ladders
3. Fire Extinguishers
4. Excavations setbacks, travel distances
5. Recordkeeping and Employee Posters
6. Fall Protection

C. Safety Procedures Interpretation
1. Sloped and Shored Excavations
2. Scaffolding
3. Personal protection
4. Electrical Protection

IX. CONSTRUCTION GEOMATICS

A. Surveying Techniques
1. Horizontal Controls
2. Vertical Controls, Elevation and Layout

B. Building Information Modeling
1. Clash Detection

X. PROJECT ADMINISTRATION

A. Procurement of Resources

1. Subcontractors
2. Materials
3. Equipment

B. Duties/Responsibilities
1. Construction Management and Engineering Job Descriptions
2. Organizational Chart
3. Design, Procurement and Construction Team
4. Craft Trade Descriptions

C. Job Site Mobilization
1. Site Layout Considerations
2. Shop drawing, Product Data Submittal and Review Process
3. Contract Clauses. Changes, Claims, Dispute Methods
4. Quality Control, Inspection and Government Regulations

D. Job Site Administration
1. Human Resources
2. Project Documentation

E. Project Closeout
1. Punch Lists, Substantial Completion, Occupancy
2. Documentation Turnover
3. Final Payment/Completion

F. Environmental Controls
1. Sustainability
2. Storm Water
3. Hazardous Materials

Level II (CPC) Examination Specifications

Specification Categories with Percentages of Questions on Examination

	APPLICATION & ANALYSIS CONTENT AREA	2022 PERCENTAGE
I.	PROJECT SCOPE DEVELOPMENT	11.0
II.	EMPLOYMENT PRACTICES	9.0
III.	WORKING RELATIONSHIPS	12.0
IV.	CONSTRUCTION START-UP AND SUPPORT	10.0
V.	CONSTRUCTION RESOURCE MANAGEMENT	12.0
VI.	CONSTRUCTION COST CONTROL	12.0
VII.	PROJECT CLOSEOUT	10.0
VIII.	CONSTRUCTION RISK MANAGEMENT	11.0
IX.	ETHICS	13.0
	TOTAL	100.0

I. PROJECT SCOPE DEVELOPMENT

A. Project Participants Roles
1. Owner
2. Architect
3. Engineer
4. Professional Constructor
5. Government Agencies
6. Subcontractor/Specialty Contractor

B. Conceptual Estimating
1. Assemblies Estimating
2. Model Area Estimating
3. Scope Development Classification Systems

C. Design Schedule and Review
1. Schematic Design Schedule
2. Design Development Schedule
3. Bid Scope Development Schedule
4. Procurement and Lead-Time Schedule

D. Cost Analysis Design Phases
   1. Value Engineering
   2. Value Analysis
   3. Life Cycle Costing
   4. Variance Analysis
   5. Constructability
   6. Feasibility

E. Site Analysis
   1. Environmental Conditions
   2. Site Conditions, Site Survey and Geological Conditions
   3. Regulatory Agencies

F. Bid Scope Development
   1. Trade Bid Packages
   2. Bid Breakdown and Proposal Form Requests

G. Bid Document Development
   1. Notice to Bidders, Instruction to Bidders, Addenda, General Requirements
   2. Pre-qualification of Bidders
   3. Pre-bid Meetings
   4. Public versus Private Bids

H. Bid Analysis and Selection/Recommendations
   1. Construction Bid Scope Analysis
   2. Subcontractor and Vendor Evaluation

I. Construction Contracts and Schedule
   1 Construction Contracts
   2. Construction Project Schedule with Lead Times, Inspections

II. EMPLOYMENT PRACTICES

A. Employment Law
   1. Equal Employment Opportunity
   2. American with Disabilities Act
   3. Immigration Act

B. Discrimination Law
   1. Hiring Discrimination
   2. Employment Discrimination
   3. Sexual Harassment

4. Hostile Work Environment

C Management Responsibilities
1. Management Liability
2. Employment Documentation

D. Construction Labor Law
1. Davis-Bacon Act
2. Fair Labor Standards Act
3. Norris-LaGuardia Act
4. National Labor Relations Act
5. Labor-Management Relations Act (Taft-Hartley Act)
6. Doctrine of Separate Gates
7. Minority Goals

III. WORKING RELATIONSHIPS

A. Team building Skills
1. Leadership Qualities
2. Team Strengths and Weakness
3. Communication and Listening Skills
4. Minimize Interpersonal Conflict
5. Coaching skills

B. Presentation and Facilitation Skills
1. Meeting Preparation
2. Meeting Leadership Skills
3. Meeting Documentation

C. Problem Solving and Negotiation Skills
1. Problem Identification/Root Causes
2. Problem Solving Methods
3. Dispute Resolution Skills

IV. CONSTRUCTION START-UP & SUPPORT

A. Job Site Set-up
1. Field Office(s)
2. Material Receiving, Storage, Truck Routes, Lay Down and Staging Areas
3. Temporary facilities
4. Pre-Job Planning Meeting
5. Pre-Construction Meeting

B. Site Procedures
    1. Field Documentation Procedures
    2. Public Relations
    3. Submittal Schedule and Procedures
    4. Quality Control Procedures
    5. Sustainability Considerations

V. CONSTRUCTION RESOURCE MANAGEMENT

A. Project Progress
    1. Submittals
    2. Production Control
    3. Project Records
    4. Quality Control

B. Material Control
    1. Design and Government Regulations
    2. Material Components and Unit Cost
    3. Procurement Process

C. Subcontractor Control
    1. Subcontractor Progress
    2. Subcontractor Coordination

D. Tools and Equipment Control
    1. Maintenance and Operation Records
    2. Equipment Production
    3. Operator Qualifications

E. Personnel Control
    1. Qualifications Evaluation
    2. Performance Evaluation
    3. Training

VI. CONSTRUCTION COST CONTROL

A. Cost Comparison and Forecasting
    1. Budgets and Cost Breakdown Structure
    2. Productivity Rates and Earned Workhours
    3. Forecast Costs at Completion
    4. Cost Reconciliation
    5. Contingency
    6. Allowances

B. Change Control and Cost Impact
    1. Changes and Cost Impact
    2. Crashing and Schedule Impact

C. Contract Interpretation
    1. Changes
    2. Notification

D. Progress Payment Terms
    1. Subcontractor and Vendor Evaluation
    2. Partial Lien Releases
    3. Title/Ownership

E. Financial Statements
    1. Financial Calculations and Ratios

VII. PROJECT CLOSEOUT

A. Closeout Process
    1. Punch Lists
    2. Substantial Completion
    3. Final Completion
    4. Occupancy
    5. Commissioning Start-up and Owner Personnel Training
    6. Demobilize Site

B. Claims Closeout Procedures
    1. Resolution

C. Documentation Turnover
    1. Warranty Protocol
    2. Owner and Operating Manuals
    3. Project Record Documents (As Builts)

D. Final Payment Procedures
    1. Retainage
    2. Lien Releases
    3. Final Draw

VIII. CONSTRUCTION RISK MANAGEMENT

A. Risk Assessment

1. Accident and Injury Statistics and Costs
2. Project Uncertainty and Risk Allocation
3. Loss Ratio and Risk
4. Financial Risk

B. Workers Compensation Costs and Liability
1. Workers Compensation and Experience Modification Rating
2. Criminal Liability and Due Diligence
3. Project Management Safety Liability

C. Safety Process and Culture
1. Behavior-Based Safety
2. Safety Management Techniques
3. Safety Orientation
4. Pre-task Safety Planning
5. Workplace Focused Safety (Drugs)

D. Safety Procedures and Documentation
1. General Duty Clause
2. Multi-employer Work Sites
3. Written Documentation Requirements
4. Confined Space Requirements
5. Scaffolds
6. Lock-out, Tag-out Requirements
7. Hazardous Communication and MSDS
8. Fall Protection and PPE
9. Excavation

IX. ETHICS

A. Business Ethics
1. Bidding and Procurement
2. General Public/Media
3. Reputation
4. Confidentiality

B. Professional Practice Ethics
1. Constructor Code of Ethics
2. Situational Ethics
3. Email and Social Media

Revision History:
Last Revised: 09/10/2022