

**AMERICAN INSTITUTE OF CONSTRUCTORS**  
**CONSTRUCTOR CERTIFICATION COMMISSION DOCUMENT NO. 29**

**2012 EXAMINATION SPECIFICATIONS FOR THE LEVEL I (AC) AND  
LEVEL II (CPC) CERTIFICATION EXAMINATIONS**

**Level I (AC) Examination Specifications**

Specification Categories with Percentages of Questions on Examination

LEVEL 1 CONSTRUCTION FUNDAMENTALS EXAMINATION	
CONSTRUCTION FUNDAMENTALS CONTENT AREA	2012 PERCENTAGE
I. COMMUNICATION SKILLS	13.0
II. ENGINEERING CONCEPTS	5.0
III. MANAGEMENT CONCEPTS	12.0
IV. MATERIALS, METHODS AND PROJECT MODELING & VISUALIZATION	10.0
V. BIDDING AND ESTIMATING	12.0
VI. BUDGETING, COSTS AND COST CONTROL	12.0
VII. PLANNING, SCHEDULING & SCHEDULE CONTROL	12.0
VIII. CONSTRUCTION SAFETY	7.0
IX. CONSTRUCTION GEOMATICS	2.0
X. PROJECT ADMINISTRATION	15.0
TOTAL	100.0

## I. COMMUNICATION SKILLS

- A. Technical Reading
- B. Technical Writing

## II. ENGINEERING CONCEPTS

- A. Engineering Material Properties
  - 1. Aggregate
  - 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. Air and Fluid Mechanics
  - 1. Psychometrics
  - 2. Hydrology
- E. Electricity

## 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
- 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
    - 1. Project Controls
    - 2. Technology
    - 3. Current Concepts
  - E. Business Ethics
    - 1. Constructor Code of Conduct
    - 2. Bidding, Purchasing and Professional Practice
- 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. Conceptual
  2. Total Future Costs
  3. Material Components
  4. 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. Work Breakdown Structure
- 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

## VII. PLANNING, SCHEDULING AND CONTROL

- A. Logical Sequences of Design, Procurement and Construction
1. Multi Crew, Phase Durations, Activity Durations and Effective Durations
- B. Event Times, Calculations, and Scheduling Terminology
1. Leadtime, Forward Pass, Backward Pass
  2. Total Float, Free Float, ES, EF, LS, LF, Critical Path(s), Completion Time

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

## IX. CONSTRUCTION GEOMATICS

- A. Equipment
  - 1. Tapes, Plumb Bobs, Level Laser, Batter Boards
- B. Topography Map
  - 1. Contours
- C. Calculations
  - 1. Horizontal Distances
  - 2. Vertical Control Elevations

## 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	2012 PERCENTAGE
I. PROJECT SCOPE DEVELOPMENT	20.0
II. EMPLOYMENT PRACTICES	5.0
III. WORKING RELATIONSHIPS	5.0
IV. CONSTRUCTION START-UP AND SUPPORT	8.0
V. CONSTRUCTION RESOURCE MANAGEMENT	18.0
VI. CONSTRUCTION COST CONTROL	18.0
VII. PROJECT CLOSEOUT	8.0
VIII. CONSTRUCTION RISK MANAGEMENT	12.0
IX. ETHICS	6.0
TOTAL	100.0

#### I. PROJECT SCOPE DEVELOPMENT

- A. Project Participants Roles
  - 1. Owner
  - 2. Architect
  - 3. Engineer
  - 4. Professional Constructor
  - 5. Government Agencies
  
- B. Conceptual Estimating
  - 1. Assemblies Estimating
  - 2. Model Area Estimating
  - 3. Scope Development Classification Systems
  
- C. Budget Monitoring
  - 1. Project Budget
  - 2. Construction Budget
  - 3. Contingency

- D. Design Schedule
  - 1. Schematic Design Schedule
  - 2. Design Development Schedule
  - 3. Bid Scope Development Schedule
  - 4. Procurement and Lead-time Schedule
  
- E. Design Review/Recommendation Process
  - 1. Schematic Design Schedule
  - 2. Design Development Schedule
  - 3. Bid Scope Development Schedule
  - 4. Procurement and Lead-time Schedule
  
- F. Cost Analysis Design Phases
  - 1. Value Engineering
  - 2. Value Analysis
  - 3. Life Cycle Costing
  - 4. Variance Analysis
  - 5. Constructability
  - 6. Feasibility
  
- G. Site Analysis
  - 1. Environmental Conditions
  - 2. Site conditions, Site survey and Geological conditions
  - 3. Regulatory agencies, permits
  
- H. Bid Scope Development
  - 1. Trade Bid Packages
  - 2. Bid Breakdown and Proposal form requests
  
- I. Bid Document Development
  - 1. Notice to Bidders, Instructions to Bidders, Addenda, General Requirement
  - 2. Pre-qualification of Bidders
  - 3. Pre-bid Meetings
  
- J. Bid Analysis and Selection/Recommendations
  - 1. Construction Bid Scope Analysis
  - 2. Subcontractor and Vendor Evaluation
  
- K. Construction Contracts and Construction 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. Roberts Rules of Order
  - 4. 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
- 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.
- 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 Work hours
  - 3. Forecast Costs at Completion
- B. Changes and Claims 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 Built)
- 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
- 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, Procurement and General Public/Media
  2. Reputation and Confidentiality
- B. Professional Practice Ethics
  1. Constructor Code of Conduct

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