International Cost Estimating and Analysis Association
Certification Examination Preparation Handbook
# Table of Contents

Introduction ........................................................................................................................................... 3

The CCEA® Examination .......................................................................................................................... 4

  Certified Cost Estimator/Analyst (CCEA®) Examination ........................................................................ 4
  Part I ....................................................................................................................................................... 4
  Part II ...................................................................................................................................................... 4

Examination Administration ...................................................................................................................... 5

CCEA® Examination Preparation Guidance .............................................................................................. 6

  Understanding the Derivation and Construction of the Exam ................................................................. 6
  Cognitive Domain .................................................................................................................................. 6
  The Examination Development Process ................................................................................................. 7
  Testable Topics List ................................................................................................................................. 7
  Foundational Knowledge ....................................................................................................................... 7
  Practical Application ............................................................................................................................... 7
  Advanced Analysis ................................................................................................................................. 8
  Case Study ............................................................................................................................................. 8
  Topic Distribution .................................................................................................................................. 8
  Question Construction ............................................................................................................................. 9

Sample Questions .................................................................................................................................... 10

Training Resources .................................................................................................................................... 15

Contact Information ................................................................................................................................. 16
**Introduction**

The Certified Cost Estimator/Analyst (CCEA®) Examination Preparation Handbook is designed to familiarize the test taker with both Parts of the CCEA® Examination, and to provide instruction on how to prepare for the test questions in each Part.

**Eligibility Requirements**

To receive the CCEA® designation, an applicant must first meet the educational and experiential eligibility requirements, and then score 70% or better on both Parts of the examination. Part I tests Foundation Knowledge and Practical Application. Part II tests Advanced Analysis and provides a Case Study.

Applicants having five or more years of experience in cost-related professions must successfully pass Part I and Part II to receive the Certified Cost Estimator/Analyst (CCEA®) designation. Applicants having at least two years of experience in the cost field must successfully pass Part I to receive the Professional Cost Estimator/Analyst (PCEA®) designation. An applicant who has less than five years of cost experience, but successfully passes both Part I and Part II will receive the Certified Cost Estimator/Analyst (CCEA®) designation when they submit evidence of five years of eligible experience.

The Professional Cost Estimator/Analyst (PCEA®), an apprentice-level certification to practitioners having at least two years of experience and a college degree (or equivalent experience). The PCEA® designation lasts three years and is not renewable, but those wishing to retain their PCEA® without achieving their CCEA® may re-apply and retake the PCEA examination every three years.

**Examination Preparation Handbook**

The CCEA® Examination section of this handbook gives an overview of Part I and Part II, while the Examination Administration section specifically walks you through the timeline and expectations of the exam day. The CCEA® Examination Preparation Guidance section then delves into the design and construction of the exam to enable testers to understand what is expected and how to use the testable topics list to prepare for the examination. The Training Resources section emphasizes the benefit of using CEBoK® in preparation for the exam. Finally, the Contact Information section outlines the variety of ways that testers can contact the ICEAA International Business Office.
The CCEA® Examination

Certified Cost Estimator/Analyst (CCEA®) Examination

The CCEA® (Certified Cost Estimator/Analyst) examination has two parts. Part I tests Foundation Knowledge and Practical Application. Applicants who successfully pass Part I and have at least two years of experience in the cost field will receive the Professional Cost Estimator/Analyst (PCEA®) designation. Part II tests Advanced Analysis and provides a Case Study. Applicants who successfully pass Part I and Part II receive the Certified Cost Estimator/Analyst (CCEA®) designation upon completion of all eligibility requirements.

Part I

Part I consists of 60 multiple choice questions worth 1 point each. The applicant must pass Part I of the examination with an overall score of 70% or greater to receive credit for the examination or attain the PCEA® Designation if the above eligibility criteria are met.

Part II

Part II consists of two sections. Once tests Advanced Analysis knowledge while
the other tests knowledge applied in a Case Study. Part II consists of 48 multiple choice questions worth 1 point each and 2 short-answer questions worth 2 points each. The applicant must pass Part II of the examination with an overall score of 70% or greater to receive credit for the examination. To attain the CCEA® designation, the applicant must pass both Parts I and II with scores of 70% or greater on each part and meet the requisite eligibility requirements.

**Examination Administration (Proctor Instructions)**

<table>
<thead>
<tr>
<th>Regardless of the examination you are taking (Part I, Part II or both), the examinations will be administered following the same format. On the examination day, those taking Part I should arrive at the test site 30 minutes prior to the scheduled exam, and follow the prescribed sequence below:</th>
<th>SAMPLE TIMELINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The proctor will have testers sign-on on the “Check-In Sheet,” collect cell phones and handout instructions.</td>
<td>9:00AM-9:30AM &lt;br&gt; <em>Today’s instruction completion timeline:</em></td>
</tr>
<tr>
<td>2. Once all electronics and notes are put away leaving only acceptable, non-graphing calculators out, Part I will be distributed and testers have 2 hours to finish this part of the exam. Please note the time the test begins in the space provided to the right.</td>
<td>9:30AM-11:30AM &lt;br&gt; <em>Today’s timeline for Part I:</em></td>
</tr>
<tr>
<td>3. For those continuing to take Part II, the proctor will allow for up to a 1-hour break. For those only taking Part I, they may be dismissed once all exam materials have been turned in to the proctor, checked off and placed in their envelope.</td>
<td>11:30AM-12:30PM &lt;br&gt; <em>Today’s break:</em></td>
</tr>
<tr>
<td>4. For those only taking Part II, they must arrive 30 minutes prior to the examination to check-in and read instructions.</td>
<td>12:00PM</td>
</tr>
<tr>
<td>5. For those taking Part II, testing will resume after the break by passing out Part II. Part II of the exam is three hours. Please note the time the test begins in the space provided to the right.</td>
<td>12:30PM-3:30PM &lt;br&gt; <em>Today’s timeline for Part II:</em></td>
</tr>
<tr>
<td>6. At the conclusion of Part II, the proctor will collect all exam material (booklets, answer sheets, scrap paper, etc.), check off receipt of materials on the “Check-In Sheet” and place all the materials in each individual’s envelope. Once a tester turns in all test material, he or she will be dismissed.</td>
<td>3:30PM</td>
</tr>
<tr>
<td>7. Upon collection of all completed exams and scrap paper the proctor will package the exams in the envelope provided, complete the proctor survey on the reverse side of the instructions and return the survey and all exam materials to the International Business Office. Exam results will be emailed to the test takers within approximately two weeks after receipt by ICEAA.</td>
<td></td>
</tr>
</tbody>
</table>

---

International Cost Estimating and Analysis Association  
*Train, Attain, Sustain...Certification Matters!*

04/28/18
CCEA® Examination Preparation Guidance

To fully prepare for the CCEA® examination, it is important for the test taker to understand the exam development process, to include the role “cognitive knowledge” played in the development of the testable topics list, the testable topics list location, the general construct of questions on the exam and the relationship of the testable topics list to the examination questions. Understanding the aforementioned elements should help test takers focus their studies properly. In addition, it is recommended that test takers study using CEBoK®, which can be obtained by contacting the ICEAA International Business Office.

Understanding the Derivation and Construction of the Exam

Cognitive Domain

There are three domains for knowledge: affective, psychomotor, and cognitive. Testable knowledge resides in the cognitive domain. Using Bloom’s taxonomy (see Figure 2 Cognitive Domain), SCA reviewed both the CEBoK® and the bodies of knowledge of other relevant professions to generate the CCEA® examination Testable Topics List. To help the test taker, “The Verbs for Each Level” (see Figure 2 Cognitive Domain) outlines commonly used verbs for each cognitive domain, which progressively increase in depth and complexity of knowledge as you move from left to right.

Levels in the Cognitive Domain

Verbs for each level

![Figure 2. Cognitive Domain](image-url)
The Examination Development Process

Testable Topics List

Once ICEAA identified both the cognitive knowledge topics and levels that cost estimators should know by the time they have attained 5 years of cost estimating experience, ICEAA determined a structure for organizing these topics. ICEAA decided to use the category topics (module headings) found in the CEBoK® training tool. These knowledge topics organized by the CEBoK® module heading make up the Testable Topics List. (See step #1 in Figure4. CCEA® Examination Development Process.)

<table>
<thead>
<tr>
<th>COST ESTIMATING BASICS</th>
<th>CCEA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Part I or PCEA®</td>
</tr>
<tr>
<td></td>
<td>Foundational Knowledge</td>
</tr>
<tr>
<td>Applications of Cost Estimating</td>
<td>X</td>
</tr>
<tr>
<td>Budgeting, Investment, and Planning</td>
<td></td>
</tr>
<tr>
<td>Analysis of Alternatives (AoA)</td>
<td>X</td>
</tr>
<tr>
<td>Economic Analysis</td>
<td></td>
</tr>
<tr>
<td>Cost Benefits Analysis</td>
<td>X</td>
</tr>
<tr>
<td>Business Case Analysis</td>
<td>X</td>
</tr>
</tbody>
</table>

Figure 3. Example of Testable Topics matched to Cognitive Level

Foundational Knowledge

Topics designated as Foundational Knowledge topics focus on an individual’s awareness, understanding, and recognition of the topic itself and/or how the topic relates to the overall cost estimating process. An individual may be asked questions on the examination such as:

- Name the three types of...
- Describe the components of...
- What is the purpose of...?
- Match the term to the correct definition.

Practical Application

Topics designated as Practical Application topics focus on an individual’s ability to apply concepts to numbers, situations, or events and to conduct simple analysis and calculations. An individual may be asked questions on the examination such as:

- Given the following event/numbers/situation, which method would you apply?
- Given the following numbers, how would they be displayed IAW...
- Given this event/situation, which technique would you recommend?
- Given the following numbers, what is the [mathematical term]?
**Advanced Analysis**

Topics designated as Advanced Analysis focus both an individual’s rote knowledge as well as knowledge learned on the job to analyze information to answer specific questions. An individual may be asked questions on the examination such as:

- Given the following information, perform a [type of] analysis
- Differentiate between the two following methods/techniques
- Extrapolate...
- Quantify the amount of...
- Calculate the cost using...

**Case Study**

Topics designated as Case Study topics focus on the array of knowledge from each topic area as they relate to real-world scenarios and contextual information. An individual may be asked questions on the examination such as:

- In the case study, the analyst decided to use which method to analyze XXX?
- The analyst in the case study determined that the cost at T3 was $40, is that correct? Which response below best describes your answer?
- Given the chart on page ##, did the analyst correctly use [insert technique]?
- Knowing that the inflation rate for year #### is XXX, did the analyst correctly determine the costs?

**Topic Distribution**

ICEAA then designed the structure of the exam and determined the topic distribution of the Testable Topics List. Please note that the Cost Estimating Body of Knowledge (CEBoK®) provides not only the topics, but the cognitive level or degree of understanding that is expected for certification. The Testable Topics list (see the CCEA® Program Handbook) is comprised of 605 topics organized by the 16 modules of CEBoK®. In any given Part of the examination, an individual can expect to see at least one question from each module or topic area.
Quality Construction

Given the topic distribution, ICEAA developed questions that assess the appropriate knowledge for the associated cognitive levels. Although on the examination you will only be given the question and five (5) responses, Figure 4 shows you the “behind the scenes” work completed for every question on the examination.

**Question Construction**

Given the relationship, \( y = 31.765x + 145.32 \) for a data set cost driven that had a range minimum of 2 workstations to 52 workstations, and the independent variable has tested positively for significance, the predicted cost for a site that had 33 workstations would be:

- a. \$1,193.57
- b. \$1,193,563
- c. \$1,797.10
- d. \$1,797,100
- e. \$208,850

**Answer:** b

**Solution:**

\[ y = 31.765 \times 33 + 145.32 \]

\[ = 10,576.15 + 145.32 \]

\[ = 10,721.47 \]

\[ = 10,721.47 \times 1000 = \$10,721,470 \]

**Reference:** CostProf Module 1

Figure 4. Question Construction
Sample Questions

Below are sample questions with associated answers and solutions.

FOUNDATIONAL KNOWLEDGE SAMPLE QUESTION #1

[Cost Estimating Basics] (Work Breakdown Structure)

**QUESTION:** Which of the following is **NOT** a purpose of the Work Breakdown Structure?

a. To provide a lower level breakout of small tasks that are easy to identify, staff, schedule, and estimate

b. To identify the organizational relationships and assign work responsibilities

c. To reduce the possibility of overlap, duplication, or redundancy of tasks

d. To provide a basis of comparison for the actual work completed versus the estimate.

e. To furnish a convenient hierarchical structure for the accumulation of resources estimates

**ANSWER:** *B*

**SOLUTION:** All of the provided responses support the purpose of the WBS except response B.


FOUNDATIONAL KNOWLEDGE SAMPLE QUESTION #2

[Learning Curve]: (Unit Learning Curve)

**QUESTION:** The following example uses which type of LC theory to determine cost?

<table>
<thead>
<tr>
<th>Unit Number (X)</th>
<th>Unit Cost (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$100.00</td>
</tr>
<tr>
<td>2</td>
<td>80.00</td>
</tr>
<tr>
<td>4</td>
<td>64.00</td>
</tr>
<tr>
<td>8</td>
<td>51.20</td>
</tr>
<tr>
<td>16</td>
<td>40.96</td>
</tr>
</tbody>
</table>

a. Wright (Cum Ave)
b. Crawford (Unit)
c. Heuristic Lot Midpoint
d. Andelohr (Production Break)
e. Straight-line deductions
ANSWER: B
SOLUTION: By definition
REFERENCE: By definition

PRACTICAL APPLICATION SAMPLE QUESTION #1
[Data Collection and Normalization]: (Reasonableness of Data-Data Quality)

QUESTION: While collecting historical data to perform an estimate for a future aircraft, you discover that the ABC aircraft is similar to the proposed aircraft. You find that the ABC aircraft cost $2.2 billion (2007$) to develop, has an average recurring production cost of $90 million (2007$), weighs 30,000 lbs, and has a range of 2000 miles and maximum speed of 550 miles per hour. What major category of data is missing from this collection effort?

a. Cost
b. Technical
c. Programmatic
d. None of the above
e. All of the above

ANSWER: C
SOLUTION: Using the various terms addressed in Module 4 of CEBoK®, programmatic is the best category for the missing data
REFERENCE: Module 4 of CEBoK®
PRACTICAL APPLICATION SAMPLE QUESTION #2
[Basic Data Analysis Principles] : (Standard Deviation)

**QUESTION:** Given the following information and a sample mean of 1680, what is the sample standard deviation for monthly salary?

<table>
<thead>
<tr>
<th>Employee</th>
<th>Monthly Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abe</td>
<td>1500</td>
</tr>
<tr>
<td>Bob</td>
<td>1700</td>
</tr>
<tr>
<td>Cindy</td>
<td>2500</td>
</tr>
<tr>
<td>Doug</td>
<td>1450</td>
</tr>
<tr>
<td>Ellen</td>
<td>1250</td>
</tr>
</tbody>
</table>

a. 434.2  
b. 485.5  
c. 971.1  
d. 1680  
e. 0

**ANSWER:** B

**SOLUTION:**

<table>
<thead>
<tr>
<th>Sample Data</th>
<th>Sample Mean</th>
<th>Delta</th>
<th>Delta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500</td>
<td>1680</td>
<td>180</td>
<td>32400</td>
</tr>
<tr>
<td>1700</td>
<td>1680</td>
<td>-20</td>
<td>400</td>
</tr>
<tr>
<td>2500</td>
<td>1680</td>
<td>-820</td>
<td>672400</td>
</tr>
<tr>
<td>1450</td>
<td>1680</td>
<td>230</td>
<td>52900</td>
</tr>
<tr>
<td>1250</td>
<td>1680</td>
<td>430</td>
<td>184900</td>
</tr>
</tbody>
</table>

Sample Mean =
Train, Attain, Sustain...Certification Matters!

REFERENCE: (Submitted by Exam Committee)
ADVANCED ANALYSIS SAMPLE QUESTION #1
[Data Collection and Normalization]: (Data Collection Process)

**QUESTION:** Which of the following does not have the potential to impact the data collection process?

- a. New technologies
- b. Schedule
- c. Cost Reduction Initiatives
- d. Inflation
- e. Development of a new CER

**ANSWER: D**

**SOLUTION:** Inflation doesn’t impact the method of collection

**REFERENCE:** Module 4 of CEBoK®

ADVANCED ANALYSIS SAMPLE QUESTION #2
[Economic Analysis]: (Real Interest Rate)

**QUESTION:** Suppose the nominal interest rate is 9.0%. The rate of inflation is 6.0%. The real interest rate is approximately:

- a. 3.0%
- b. 1.5%
- c. -3.0%
- d. 15.0%
- e. Unknown

**ANSWER: A**

**SOLUTION:** The real interest rate is approximately the nominal rate of interest minus the rate of inflation.

**REFERENCE:** (Submitted by Committee)

CASE STUDY SAMPLE QUESTIONS

Because the questions within the Case Study section are related to the associated case study and reference material, we cannot provide you sample questions for this section. The premise of the case study states that you are a senior cost estimator who must review the work of a junior cost estimator. The Case Study will be approximately 15 pages in length to describe the requirements, and contextual information that will be pertinent to answer the case questions. Within this section you will be given information and required to judge and assess the work of the junior analyst.

For example, you will be given background information with a series of exhibits. Each question will refer you to a specific piece of information within the case study or an exhibit and you must answer the question using only the referred information.
Training Resources

Training is the most critical component of the cost career field. Without thorough training at all levels, it would be difficult to understand the breadth and depth of knowledge and skills required to generate quality cost estimates and nearly impossible to keep up with the continual updates in the profession. In recent years, ICEAA had endorsed the creation of CostPROF, which was an excellent cost training guide. However, with the expansive changes to the cost certification program and an increased need for better training materials to prepare for the CCEA® certification exam, CEBoK® was developed to provide a comprehensive and authoritative reference tool for cost estimators. The foundations of CEBoK® and the initial development of the improved CCEA® examination share common ground in covering the same Testable Topics List derived from the ICEAA Cost Estimating Body of Knowledge. Therefore, utilizing CEBoK® to its fullest potential will enable cost estimators to best understand the foundational knowledge and practical applications of cost and, when combined with actual cost experience, will best enable an individual to pass both the Professional Cost Estimator and Analyst (PCEA®) and the Certified Cost Estimator and Analyst (CCEA®) exams. You may request a copy of CEBoK® through the ICEAA International Business Office.

Acceptable and Unacceptable Exam Supplies

This is a closed-book, no notes, no computer exam. Examinees may bring writing instruments, erasers, and acceptable calculators to the exam.

Acceptable calculators may feature:

- Logarithm, universal power, memory, and parentheses keys
- Statistical function keys (e.g., mean, standard deviation, correlation, linear regression) keys

Calculators may NOT

- Use preprogrammed statistical functions (if these functions are available on the calculator, they must be disabled prior to the exam)
- Have graphing capability
- Be on a cell phone or other device with data or internet connectivity (cell phones will be collected by the proctor at the start of the exam)

It is the sole responsibility of the examinee to bring an appropriate calculator. Calculators will not be provided at the exam site.
Contact Information

For questions pertaining to the Certification Program and the PCEA® or CCEA® exams, please refer to the ICEAA website at:
http://www.iceaaonline.com/

Or contact us directly:

ICEAA International Business Office
4115 Annandale Road
Suite 306
Annandale, VA 22003

Email :
icea@iceaaonline.org
Phone :
703-642-3090

Office hours: 8:30am -5:00pm ET, Monday to Friday