

# INCOSE Systems Engineering Professional (SEP) Program



# Path to SEP Certification Presentation

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24 February 2021

# What is SEP Certification

- Certification is a formal process whereby a community of knowledgeable, experienced, and skilled representatives of an organization, such as INCOSE, provides confirmation of an individual's competency (demonstrated knowledge, education, and experience) in a specified profession.
- The SEP certification differs from a certificate which documents the successful completion of a training or educational program.
- A Professional Engineering License issued by an government entity to practice in regulatory boundaries. (i.e. buildings, bridges, etc.)
- INCOSE's knowledge exam is a multiple-choice test based on the content of the INCOSE Systems Engineering Handbook.

# INCOSE Certification




## Multi-Level Base Credentials

*The base ASEP, CSEP, and ESEP credentials cover the breadth of systems engineering at increasing levels of leadership, accomplishments, and experience.*



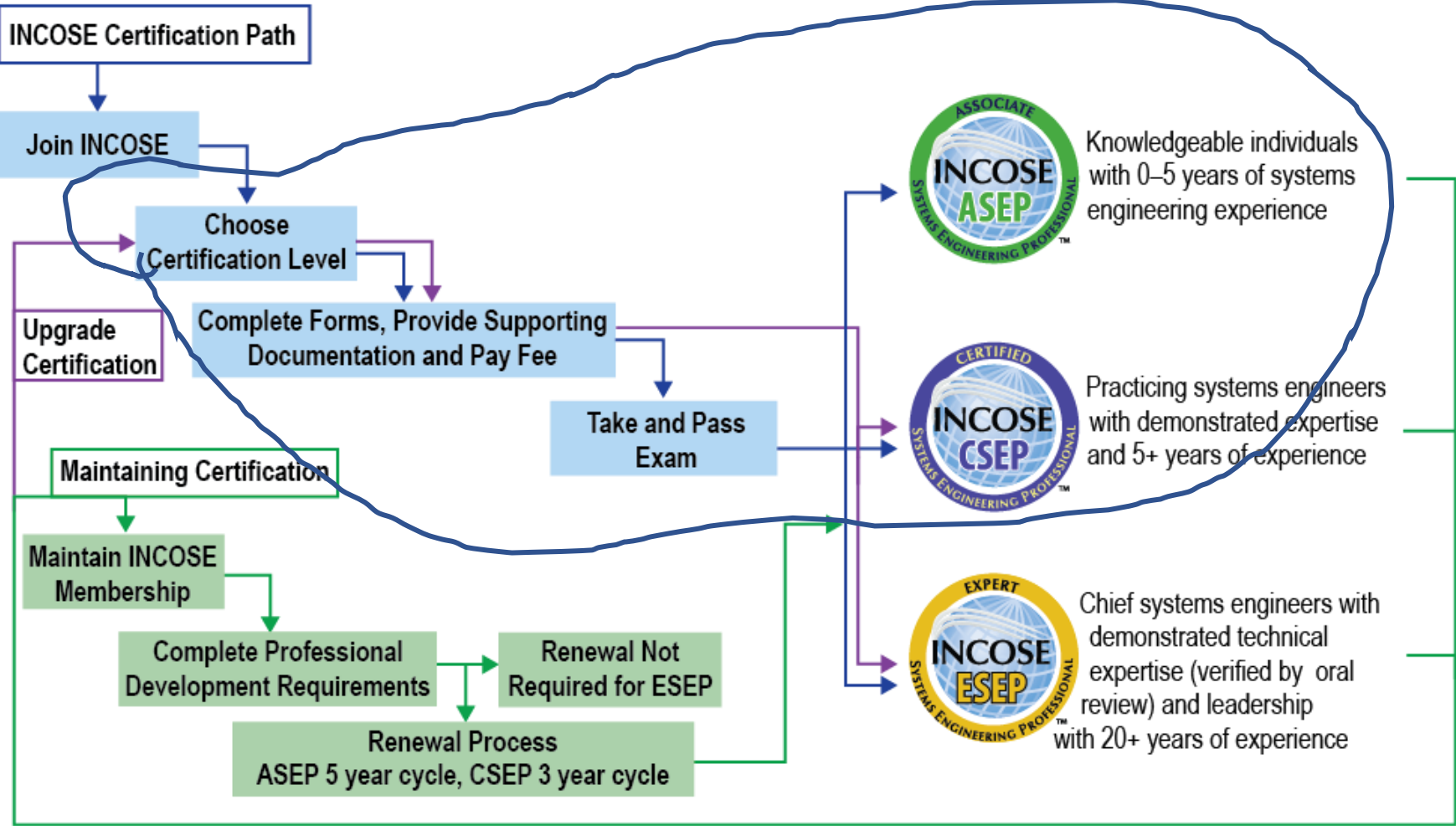
<https://www.incose.org/systems-engineering-certification/the-certification-process/how-do-i-renew>

# Certification Levels

LEVEL	Experience	Education	References	Exam
	None Required	None Required	None Required	Same Exam as CSEP
	Minimum 5 years SE experience (see <a href="#">SE function area list</a> )	Technical Degree (can be augmented with additional years of experience without a technical degree)	3 references (cumulative coverage of the years of experience)	CSEP exam based on INCOSE SE Handbook
	Minimum 25 years (20 if CSEP) SE experience (see <a href="#">SE function area list</a> ) Minimum 5 years of professional development credit	Technical Degree (can be augmented with additional years of experience without a technical degree)	3 references (cumulative coverage of at least the most recent 10 years of experience) Support panel review, if required	No examination, panel review

<https://www.incose.org/systems-engineering-certification/certification-agreements/equivalency-programs>

# Discussion on the Certification Exam



# Application Process for each SEP Certification

- ASEP Certification Process
  - <https://www.incose.org/systems-engineering-certification/apply-for-asep> @ \$150 fee

Note: ASEP to CSEP transition fee is \$200 fee

- CSEP Certification Process
  - <https://www.incose.org/systems-engineering-certification/apply-for-csep> @\$300 fee
- ESEP
  - <https://www.incose.org/systems-engineering-certification/apply-for-eseq> @\$550
- Associated forms for SEP Certification
  - <https://www.incose.org/systems-engineering-certification/certification-forms>
- Open on an Apple Mac
  - [https://www.incose.org/docs/default-source/certification/howto\\_opencertificationformsonamac.pdf?sfvrsn=b57993c6\\_0](https://www.incose.org/docs/default-source/certification/howto_opencertificationformsonamac.pdf?sfvrsn=b57993c6_0)

# San Diego Chapter Support

- San Diego Chapter will provide the following support:
  - Application preparation and process reviews
  - SEP Mentoring with 'Reach back' review
  - Practice questions
  - Celebration upon being awarded a SEP certification level



# SEP Certification Test Options

- The Prometric Company
  - No longer available after March 31 2021
- On-line Testing
  - April Launch, more news to come
  - INCOSE Membership and SEP application is required for the on-line test
  - The on-line testing will have the ability to toggle between questions for final review prior to answer submission just as the computer test had in the past.
- A paper test through the INCOSE SAN DIEGO Chapter during the WSRC 2021 on September 19, 2021, actual dates to be determined.
  - Cost estimated between \$20 to \$30
  - Candidates do not have to be an INCOSE member to take the paper test
    - 100 questions in 100 minutes <https://www.incose.org/systems-engineering-certification/about-the-exam/paper-exams>
    - Example of answer sheet [https://www.incose.org/docs/default-source/certification/sample-answer-sheet-not-for-use-during-exam.jpg?sfvrsn=5dfc9fc6\\_0](https://www.incose.org/docs/default-source/certification/sample-answer-sheet-not-for-use-during-exam.jpg?sfvrsn=5dfc9fc6_0)

# Exam Preparations Options: Cohorts

1. Individual Study of the INCOSE SE Handbook (SEH): time is dependent on the individual.
2. On-line (virtual) training options requiring Approximately 40 hours
  - a) Cohort Session: This will meet at selected times (lunch or after work) for an estimated 1 hour/day x 12 days : proposed May 26 to Aug 18 , 2021.

1a	On-Line Cohorts (12 Meetings) meetings from 12 to 1:00 pm	May 26 to Aug 18 , 2021	a) Enables members to review during the work day b) led by a volunteer member with a backup presenter c) leaves time for all cohorts to self study prior to WSRC	a) Provides minimum amount of time to address the Handbook b) each cohort needs to learn how to present for consistency c) requires all cohort to pre-read material for perspective
1b	On-Line Cohorts (12 Meetings) meetings from 7:30 to 8:30 pm	May 26 to Aug 18 , 2021	a) Enables members to review during the work day b) led by a volunteer member with a backup presenter c) leaves time for all cohorts to self study prior to WSRC	a) Provides minimum amount of time to address the Handbook b) each cohort needs to learn how to present for consistency c) requires all cohort to pre-read material for perspective

Selected Option will be based on a poll of interested membership

# Exam Preparations Options: Saturdays

2	3 sessions of 8 hours on Saturday	Saturdays Aug 14, 21, 28	<ul style="list-style-type: none"> <li>a) enables all members to engage and dialogue the SEH context</li> <li>b) led by an experienced presenter</li> </ul>	<ul style="list-style-type: none"> <li>a) Provides limited time to address the Handbook</li> <li>b) requires all members to pre-read material</li> </ul>
3	4 sessions of 8 hours (2 consecutive weekends)	Aug 21,22 & 28,29	<ul style="list-style-type: none"> <li>a) enables all members to engage and dialogue the SEH context over greater time period</li> <li>b) 32 hours of Handbook review and dialogue SEH context</li> </ul>	<ul style="list-style-type: none"> <li>a) significant impact to family life during vacation months</li> <li>b) commitment to Weekend meetings</li> </ul>
4	4 sessions of 8 hours (4 consecutive Saturdays)	July 24, Aug 14, 21, 28	<ul style="list-style-type: none"> <li>a) enables all members to engage and dialogue the SEH context over greater time period</li> <li>b) 32 hours of Handbook review and dialogue the context</li> <li>c) provides review time between sessions to improve comprehension and prepare perspective</li> </ul>	<ul style="list-style-type: none"> <li>a) reduced impact on family life during vacation months</li> <li>b) commitment to Saturday meetings</li> </ul>

Selected Option will be based on a poll of interested membership

# Exam Preparations Options: Hybrid Options

<p>5 Hybrid 1</p>	<p>On-Line Cohorts (12 Meetings) meetings from 12 to 1:00 pm plus 3 Sessions of 8 hours</p>	<p>May 26 to Aug 18 , 2021 plus June 19, July 17 Aug 14</p>	<p>a) enables cohorts to review 4 times @ 1 hour/session, followed by 1 8 hour session to dialogue context b) 36 hours of Handbook review and dialogue the context c) collaborates review time between sessions to improve comprehension and prepare perspectives</p>	<p>a) rminimum impact on family life during vacation months b) commitment to Saturday meetings c) complicated schedule</p>
<p>6 hybrid 2</p>	<p>On-Line Cohorts (12 Meetings) meetings from 7:30 to 8:30 pm plus 3 Sessions of 8 hours</p>	<p>May 26 to Aug 18 , 2021 plus June 19, July 17 Aug 14</p>	<p>a) enables cohorts to review 4 times @ 1 hour/session, followed by 1 8 hour session to dialogue context b) 36 hours of Handbook review and dialogue the context c) collaborates review time between sessions to improve comprehension and prepare perspectives</p>	<p>a) minimum impact on family life during vacation months b) commitment to Saturday meetings c) complicated schedule</p>
<p>7 hybrid 3</p>	<p>On-Line Cohorts (12 Meetings) meetings from 12 to 1:00 pm plus 8 Sessions of 4 hours</p>	<p>May 26 to Aug 18 , 2021 plus Jun 5,12,26 Jul 12,19,26, Aug 10,24</p>	<p>a) enables cohorts to review 12 times @ 1 hour/session, followed by 10 4 hour session to dialogue context b) 44 hours of Handbook review and dialogue the context c) collaborates review time between sessions to improve comprehension and prepare perspectives d) provides self study time prior to WSRC</p>	<p>a) minimum impact on family life during vacation months b) alternate commitment to Saturday meetings c) complicated schedule</p>

# Proposed Cohort Session

- **12 Week Cohorts Session:**

- **Proposed dates:** May 26 - Aug 18

**Proposed meeting day:** Wednesday between 12 and 1 pm, Pacific Time.

**Proposed format:** Each cohort is assigned one topic area. If many sign up, then multiple cohorts will be assigned to the same area. Each week, a cohort team will present their assignment. Slides will be sent out NLT 24 hours beforehand (e.g., Tuesday at noon).

- **Pre-reading:** All cohorts are to read Chapters 1 and 2 prior to sessions
- **Presenters:** Cohort will volunteer for a section in the book to present, primary topics of the section along with a possible practice question.

# Proposed Cohort Session:

[https://sdincose.org/2021\\_cohorts/](https://sdincose.org/2021_cohorts/)

- **Proposed Schedule:**

Session 1 ----- Welcome, organization of Cohorts session.

Session 2 ----- Chapter 3, Generic Life Cycle Stages

Session 3 ----- Chapter 4, Technical Processes, Part 1

Session 4 ----- Chapter 4, Technical Processes, Part 2

Session 5 ----- Chapter 5, Technical Management Processes, Part 1

Session 6 ----- Chapter 5, Technical Management Processes, Part 2

Session 7 ----- Chapter 7, Organizational Project-Enabling Processes

Session 8 ----- Chapter 8, Tailoring process and Application of Systems Engineering

Session 9 ----- Chapter 9, Cross-Cutting Systems Engineering Methods, Part 1

Session 10 ----- Chapter 9, Cross-Cutting Systems Engineering Methods, Part 2

Session 11 ----- Chapter 10, Specialty Engineering Activities, Part 1

Session 12 ----- Chapter 10, Specialty Engineering Activities, Part 2

# Expectations of Cohorts

- Cohorts are Committed volunteers for a (or more) section in the SEH V4.
- Each section will have a Primary and a Secondary person who will each prepare, and collaborate on the assignment
- Assignments:
  - Read of the assigned sections prior to the scheduled section
  - Identify and discuss the significant elements in the assigned section to include:
    - a) The Purpose of each process
    - b) IPO elements and their relation to other processes
    - c) The primary context and concepts of the assigned section
    - d) What are the significant tools (from Chapter 9 and 10) relevant to this process
    - e) Significance of the Controls and Enablers for the assigned process
    - f) What are significant elements in the Common tips and approaches
    - g) Development two practice test question with reference per section  
(see examples below and those provide in the INCOSE link)
- All Assignments are to be submitted to the SD website two days prior to the assigned presentation date



INCOSE Core Learning Objective Description	SEH v.4 Chapters
<b>Body of Knowledge, Systems Engineering Handbook version 4 (SEH v.4)</b>	
Systems Engineering and Life Cycle Overview	2 and 3
Understand the Definition and Concepts of a System	
Understand the Complexities of a System of Systems	
Know the Concepts of System Science and System thinking	
Analyze the Functions and Relationships of the Various Life Cycle Phases	
Technical Processes	4
Understand the Rationale/Know the Steps for the Genesis of a New System	
Know the Importance of the identifying Stakeholder Needs and Requirements	
Know the Concepts of Requirements Definition	
Understand the Concepts of Architecture Definition	
Know the Importance of the Design Definition Process and its Relationship to Implementation	
Understand the Relationship of Systems Analysis to the Other Technical Processes	
Know the Aspects of Implementation and Integration	
Understand the Importance of Verification in the System Process	
Understand the Importance of Validation to the Stakeholders	
Understand the Activities Necessary for the Customer to Employ the System	
Understand how Operations and Maintenance Relate to the Other Technical Processes	
Technical Management Processes	5
Understand how the Systems Engineer contributes to the Business Aspect	
Know the Activities Whereby the Systems Engineer Relates the Technical Aspects to the Business Aspects of the System	
Understand How Decision Management Supports the Other Processes	
Understand the Importance of Risk Management in the System Development Process	
Understand the Importance of Configuration Management in the System Development Process	
Understand the Contribution Systems Engineering Makes to Information, Measurement, and Quality Assurance Processes	
Understand the Importance of Providing Evidence of Implementation Compliance	





INCOSE Core Learning Objective Description	SEH v.4 Chapters
<b>Organizational Strategy and Operations</b>	6 and 7
Understand How Systems Engineering Supports the Agreement Processes	
Know the Organizational Activities that Generate And Support System Development	
<b>Application of Systems Engineering</b>	8
Know the Concepts of Tailoring Systems Engineering Processes for Various Product Sectors	
Understand How Systems Engineering is Applied in Varying Domains	
<b>Cross-Cutting System Engineering Methods</b>	9
Know the various Cross-Cutting System Engineering Methods	
Analyze How these Methods can be Applied in Concert with Traditional Systems Engineering	
Understand How Modeling Can Benefit the Systems Engineering and the Life Cycle Process	
<b>Specialty Engineering</b>	10 and throughout SEH v.4
Know the Activities and Importance of Specialty Engineering	
Analyze the Relationship Between Specialty Engineering and the Technical Processes	
Understand the Relationship of Logistics Engineering to the Technical Processes, Especially the Maintenance Process	
Understand the Relationship of Human Specialty Engineering Functions to Technical Processes, Especially Operations Process	

# Class logistics

- Items the students provide:

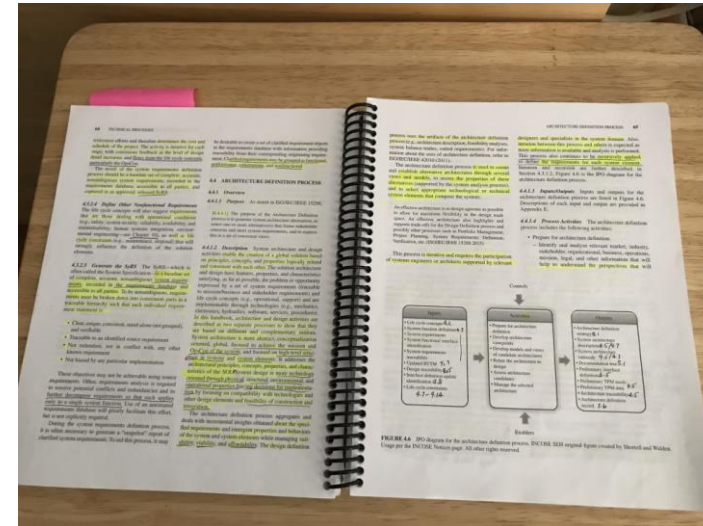
- Personal copy of INCOSE SE Handbook: electronic, or soft bound: (suggest to spiral bind the book for easier reading

- Scratch paper and writing instrument:

- Highlighter if desired

- Provided Material

- Presentation materials will be dependent on the presentation option selected by the members



# Elements of Practice Test questions

- All practice questions
  - 1) May contain a maximum of six candidate answers
  - 2) The question is to be succinct and
    - 1) Identify where in the SEH the question originates
    - 2) Identify the number of correct answers (Choose n)
  - 3) Do not contain 'True/False' questions
  - 4) There is at least one (possibly more) candidate answer which can quickly be discarded (these answers are not related to the question).
  - 5) There is/are at least one (possibly more) answer which ensures the member must truly 'think' hard of its correctness.
  - 6) The correct answers are directly from the relevant section in the SEH

# Example Test question

- **Which descriptions about a decision gate are correct? (Choose 3)**
- **A.** For any project, there are at least two decision gates: authority to proceed and final acceptance of the project deliverable.
- **B.** All reviews and milestones are decision gates.
- **C.** A decision gate is an approval event in the project cycle.
- **D.** A decision gate is defined and included in the schedule by the project manager, or the customer.
- **E.** Proceeding beyond the decision gate will not entail risk.

Reference:

Page 26 and 27, chapter 3.2.2 Decision gate

# Example Test question

**What are the purposes of the development life cycle stage?**

**(Choose 3)**

- a) Define/refine system requirements
- b) Propose viable solutions
- c) Implement initial system
- d) Inspect and verify
- e) Integrate, verify, and validate system

Reference: Page 28, Table 3.1

# INCOSE Sample Questions

- [https://www.incose.org/docs/default-source/certification/sample-questions.pdf?sfvrsn=1db983c6\\_0](https://www.incose.org/docs/default-source/certification/sample-questions.pdf?sfvrsn=1db983c6_0)