

# INCOSE Systems Engineering Professional (SEP) Program



## Path to SEP Certification

**David Mason**  
**Expert Systems Engineering  
Professional (ESEP)**

**April 13, 2021**

# What is SEP Certification

- Certification is a formal process whereby a community of knowledgeable, experienced, and skilled representatives of an organization, i.e. 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 (SEH).

# 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.*



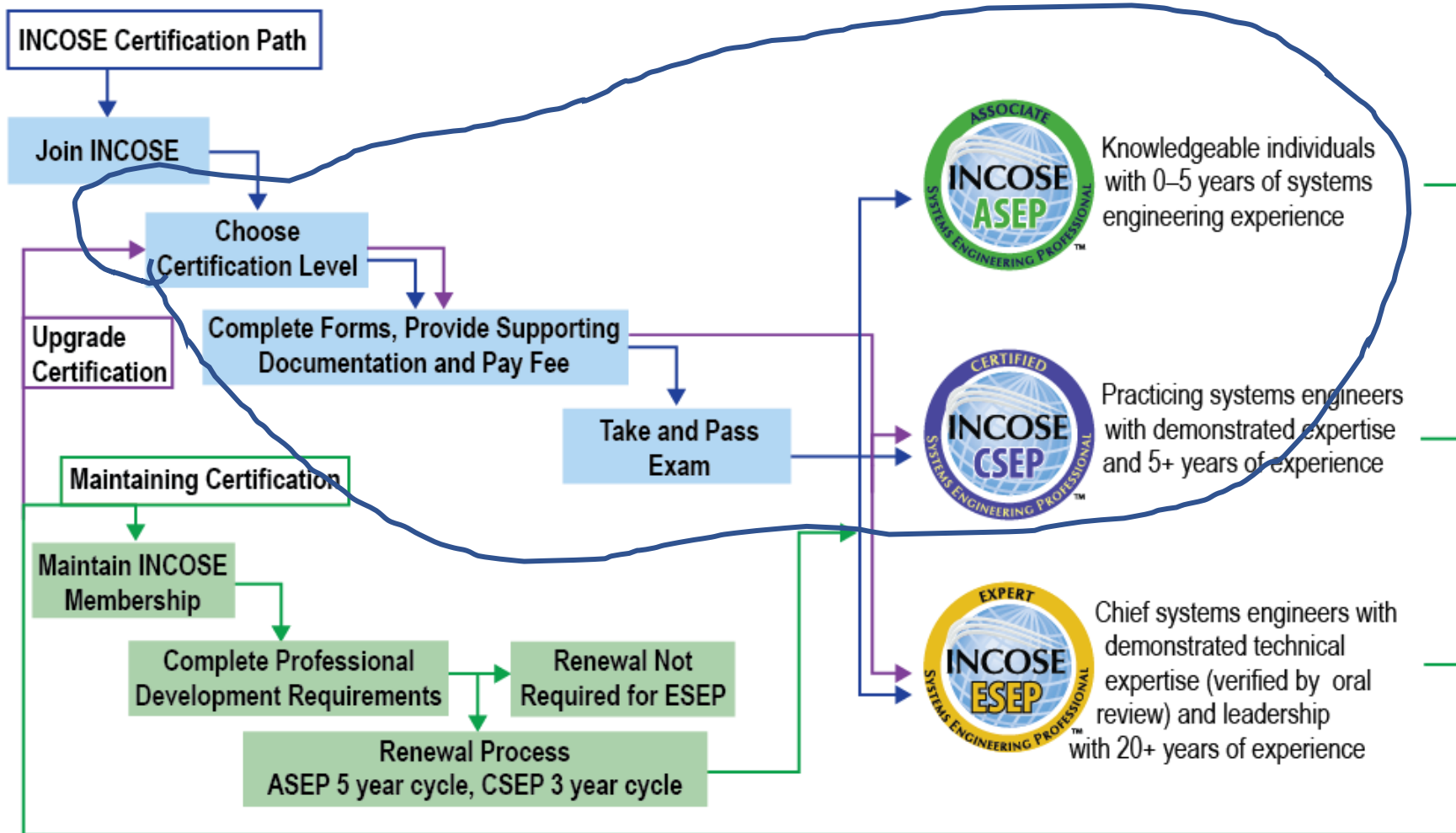
<https://www.incose.org/systems-engineering-certification/the-certification-process/how-do-i-renew>

# 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
- 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-esepe> @\$550 fee
- 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)

# SEP Paper Test at WSRC, San Diego, 09-19-2021

**SEP paper test to be administered by Diego Chapter on Sun. 09-19-2021 at the WSRC 2021, Courtyard by Marriott, Liberty Station, San Diego**

- Cost estimated between \$20 to \$30
- Candidates do not have to be an INCOSE member
- **San Diego Chapter to 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
- **Los Angeles Chapter to extend socials to everyone who takes the test:**
  - Complimentary Happy Hour after the test at Courtyard by Marriott
  - Complimentary Dinner at annual Holiday Party, date/location TBD



# 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.
  - INCOSE is looking for volunteers to Beta test the on-line SEP
- 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. On-line (virtual) training options require preparations and commitment.

a. Cohort Session: Meet at selected times (lunch and/or after work) for an estimated 1 hour/session @12 sessions: proposed May 26 to Aug 18 , 2021, or @ 24 sessions.

Option	Preparation Option	estimated Schedule	Pro	Con
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 time to address SEH b) each cohort needs to learn how to present for consistency c) requires cohorts 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 time to address SEH b) each cohort must learn how to present for consistency c) requires cohorts to pre-read material for perspective
1c	On-Line Cohorts (24 Meetings) meetings at lunch time + after work	May 26 to Aug 18 , 2021	a) Enables members to review during the work day and again after work b) led by a volunteer section member with an alternate presenter c) sustains connectivity with self study prior to WSRC d) increase time to group study SEH	a) Requires additional time committed to group study b) interferes with family time c) puts greater demand on being prepared continuously d) cohort to learn how to present for consistency c) requires all cohort to pre-read & develop presentation material for perspective

# Exam Preparations Options: Saturdays

Option	Preparation Option	estimated Schedule	Pro	Con
2	3 sessions of 8 hours on Saturday	Saturdays Aug 14, 21, 28	a) enables all members to engage and dialogue the SEH context b) led by an experienced presenter	a) Provides limited time to address the SEH b) requires members to pre-read material
3	4 sessions of 8 hours (2 consecutive weekends)	Aug 21,22 & 28,29	a) enables all members to engage and dialogue SEH context over greater time period b) 32 hours of Handbook review and dialogue SEH context	a) significant impact to family life during vacation months b) commitment to Weekend meetings
4	4 sessions of 8 hours (4 consecutive Saturdays)	July 24,Aug 14, 21 ,28	a) enables all members to engage +dialogue the SEH context over greater time period b) 32 hours of Handbook review and dialogue the context c) provides review time between sessions to improve comprehension and prepare perspective	a) reduced impact on family life during vacation months b) commitment to Saturday meetings

Selected Option will be based on a poll of interested membership

# Exam Preparations Options: Hybrid Options

Option	Preparation Option	estimated Schedule	Pro	Con
5 Hybrid 1	On-Line Cohorts (12 Meetings) meetings from 12 to 1:00 pm plus 3 Sessions of 8 hours	May 26 to Aug 18 , 2021 plus June 19, July 17 Aug 14	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	a) minimum impact on family life during vacation months b) commitment to Saturday meetings c) complicated schedule
6 hybrid 2	On-Line Cohorts (12 Meetings) meetings from 7:30 to 8:30 pm plus 3 Sessions of 8 hours	May 26 to Aug 18 , 2021 plus June 19, July 17 Aug 14	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	a) minimum impact on family life during vacation months b) commitment to Saturday meetings c) complicated schedule
7 hybrid 3	On-Line Cohorts (12 Meetings) meetings from 12 to 1:00 pm plus 8 Sessions of 4 hours	May 26 to Aug 18 , 2021 plus Jun 5, 12, 26 Jul 12, 19, 26, Aug 10, 24	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	a) minimum impact on family life during vacation months b) alternate commitment to Saturday meetings c) complicated schedule

# Proposed Cohort Session

- **12 Week Cohorts Session:**
- **Proposed dates:** May 26 - Aug 18

**Proposed meeting day:** Wednesday between 12 and 1 pm, Pacific Daylight Time, or after work beginning at 7:30 pm for 1 hour

**Proposed format:** Each cohort is assigned one topic area with an alternate.

- Each Cohort Team will develop their presentation and submit to the SD website NLT 24 hours beforehand their presentation (e.g., Tuesday at noon).
  - The Cohort team will present their assignment in 55 minutes allowing for questions and comments.
  - The Cohort will be responsible to keep the discussions relevant and manage the time
  - **Pre-reading:** All cohorts are to read Chapters 1 and 2 prior to first sessions
- **Presenters:** Cohort will volunteer for a section in the book to present the primary topics, or concepts of the section, along with possible practice question See slide 22. **DO NOT READ THE BOOK TO THE AUDIENCE**

# Proposed Cohort Session: 1 hour/Session @12 sessions

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

- **Proposed Schedule:**

Session 1 ----- Welcome, organization of Cohorts session. Section Assignments + Review Chapter 1 &2

Session 2 ----- Chapter 3, Generic Life Cycle Stages: Emphasis 3.2 to 3.4

Session 3 ----- Chapter 4, Technical Processes, Part 1: 4.1 through 4.5, with 4.6

Session 4 ----- Chapter 4, Technical Processes, Part 2: 4.7 through 4.14

Session 5 ----- Chapter 5, Technical Management Processes, Part 1: 5.1 through 5.3

Session 6 ----- Chapter 5, Technical Management Processes, Part 2: 5.4 through 5.8

Session 7 ----- Chapter 7, Organizational Project-Enabling Processes: Chapter 7 with relations to Chapter 5

Session 8 ----- Chapter 8, Tailoring process and Application of Systems Engineering: Emphasis on 8.1 through 8.3

Session 9 ---- Chapter 9, Cross-Cutting Systems Engineering Methods, Part 1: 9.1. through 9.4

Session 10 ---- Chapter 9, Cross-Cutting Systems Engineering Methods, Part 2: 9.5 through 9.9

Session 11 ---- Chapter 10, Specialty Engineering Activities, Part 1: 10.1 though 10.6

Session 12 ---- Chapter 10, Specialty Engineering Activities, Part 2: 10.7 through 10.14

# Proposed Cohort Session: 1 hour/Session @24 sessions

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

- **Proposed Schedule:**

- |                 |   |
|-----------------|---|
| Session 1 (LT)  | Welcome, organization of Cohorts session. Section Assignments + Review Chapter 1 &2 |
| Session 2 (AW)  | Chapter 3, Generic Life Cycle Stages: Emphasis 3.2 to 3.3                           |
| Session 3 (LT)  | Chapter 4, Technical Processes: 4.1 + 4.2, with 4.6                                 |
| Session 4 (AW)  | Chapter 4, Technical Processes: 4.3 with 4.6  |
| Session 5 (LT)  | Chapter 4, Technical Processes: 4.4 thru 4.5 with 4.6                               |
| Session 6 (AW)  | Chapter 4, Technical Processes: 4.7 thru 4.8 with 4.6                               |
| Session 7 (LT)  | Chapter 4, Technical Processes: 4.9 thru 4.11 with 4.6                              |
| Session 8 (AW)  | Chapter 4, Technical Processes: 4.12 thru 4.13 with 4.6                             |
| Session 9 (LT)  | Chapter 4, Technical Processes: 4.14 + Chapter 4 Summary (detailed questions)       |
| Session 10 (AW) | Chapter 5, Technical Management Processes: 5.1 through 5.2                          |
| Session 11 (LT) | Chapter 5, Technical Management Processes: 5.3 through 5.4                          |
| Session 12 (AW) | Chapter 5, Technical Management Processes: 5.5 through 5.6                          |

# Proposed Cohort Session: 1 hour/Session @24 sessions

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

## **Proposed Schedule:**

Session 13 (LT)	Chapter 5, Technical Management Processes: 5.7 through 5.8
Session 14 (AW)	Chapter 6: Acquisition Processes: 6.1 and 6.2
Session 15 (LT)	Chapter 7, Organizational Project-Enabling Processes: 7.1 thru 7.3
Session 16 (AW)	Chapter 7, Organizational Project-Enabling Processes: 7.4 thru 7.6
Session 17 (LT)	Chapter 8, Tailoring process and Application of Systems Engineering: 8.1 through 8.3
Session 18 (AW)	Chapter 8, Tailoring process and Application of Systems Engineering: 8.4 through 8.6
Session 19 (LT)	Chapter 9, Cross-Cutting Systems Engineering Methods: 9.1. through 9.3
Session 20 (AW)	Chapter 9, Cross-Cutting Systems Engineering Methods: 9.4. through 9.6
Session 21 (LT)	Chapter 9, Cross-Cutting Systems Engineering Methods: 9.7. through 9.9
Session 22 (AW)	Chapter 10, Specialty Engineering Activities: 10.1 though 10.4
Session 23 (LT)	Chapter 10, Specialty Engineering Activities: 10.5 though 10.9
Session 24 (AW)	Chapter 10, Specialty Engineering Activities: 10.10 through 10.14



# Expectations of Cohort Leads

- Each section will have a Primary and a Alternate Lead person who will each prepare, and collaborate on the assignment as they deem required.
- Lead Assignments:
  - Cohort Leads must be Committed volunteers for one or more sections in the SEH V4 as Primary or Alternate Lead.
  - Introduce all cohorts
  - ACT as POC
  - Discuss the schedule and format for the session: ensure the presentation material is available, how question forming
  - Reserve, start, and record each session. Work any problems, upload the recording to the SD Website.
  - Share with everyone the SEP test specifics.
  - Keep the discussions on topic
- All Assignments are to be submitted to the SD website two days prior to the assigned presentation date

# Expectations of Cohort Presenters

- Cohorts
  - Committed to the schedule for the Cohort training.
  - 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 provided 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	

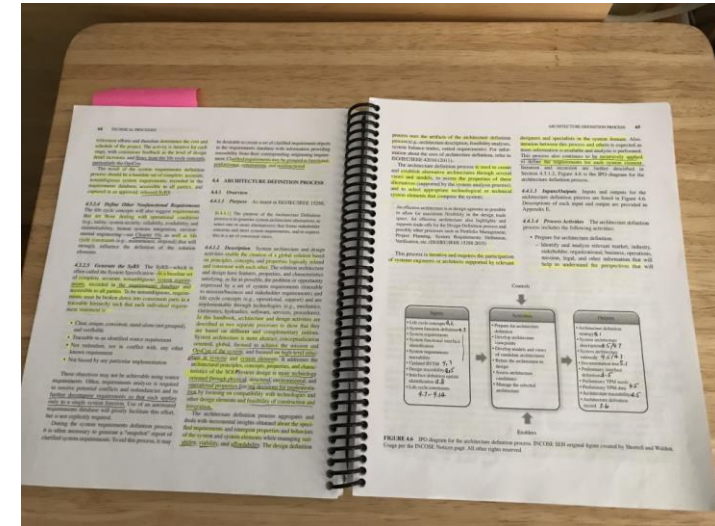


INCOSE Core Learning Objective Description	SEH v.4 Chapters
Organizational Strategy and Operations	6 and 7
Understand How Systems Engineering Supports the Agreement Processes	
Know the Organizational Activities that Generate And Support System Development	
Application of Systems Engineering	8
Know the Concepts of Tailoring Systems Engineering Processes for Various Product Sectors	
Understand How Systems Engineering is Applied in Varying Domains	
Cross-Cutting System Engineering Methods	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	
Specialty Engineering	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: suggestion is to spiral bind the book for easier reading
  - <https://connect.incose.org/pages/store.aspx>
  - Scratch paper, highlighter, pen
  - A strong desire to learn and obtain your SEP
- Provided Material
  - Presentation materials will be developed by the presenters for each assigned section. These will be uploaded to the SD INCOSE website.



# 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 'understand' the material in the section.
  - 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



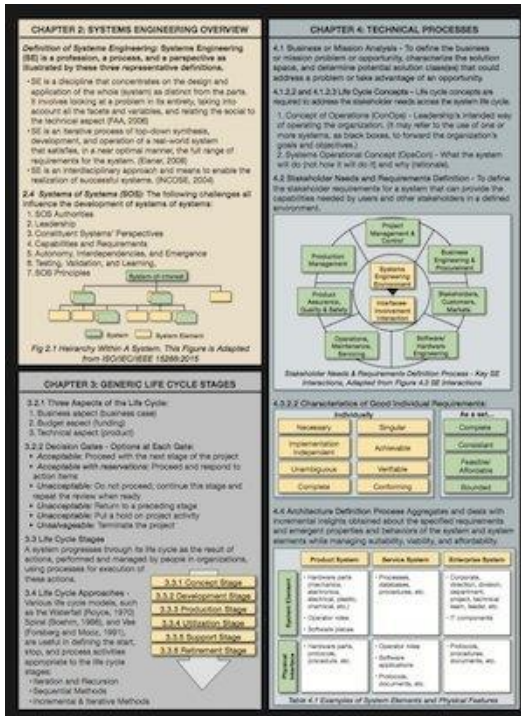
# Example Test question

**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)
- [file:///CSEP Exam Success Sheet \(Based on INCOSE SE Handbook v4.0\)/ Reed Integration, Inc., Becky Reed, ESEP/ 0649241891147/ Amazon.com/ Books](file:///CSEP%20Exam%20Success%20Sheet%20(Based%20on%20INCOSE%20SE%20Handbook%20v4.0)/Reed%20Integration,%20Inc.,%20Becky%20Reed,%20ESEP/0649241891147/Amazon.com/Books)
- [file:///The CSEP Study Guide/ for SEH v4/ Zielinski, Stephen A, King Jr, William G/ 9781973721086/ Amazon.com/ Books](file:///The%20CSEP%20Study%20Guide/for%20SEH%20v4/Zielinski,%20Stephen%20A,%20King%20Jr,%20William%20G/9781973721086/Amazon.com/Books)

