CER-PROC-01: INCOSE Systems Engineering Professional (SEP) Certification Program Definition and Requirements

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Foreword

In 2002, the Board of Directors (BOD) of the International Council on Systems Engineering (INCOSE) commissioned a working group to develop a plan for certifying Systems Engineers who have demonstrated knowledge and experience in the discipline. That working group developed a plan that evolved to the INCOSE-approved Operational Plan for the Systems Engineering Certification Program (v6, 2016). That plan contained the policies, processes, and procedures which govern and guide the Certification Program.

In 2017, the Certification Advisory Group (CAG) approved splitting that document into two separate documents:

- The first document is the new CER-PROC-01 INCOSE Systems Engineering Professional (SEP) Certification Program Definition and Requirements (this document). This document is an overview of the SEP program management plan defining the Certification Program and its requirements. It is a public document developed by the CAG.
- The second document is CER-PROC-02 INCOSE Certification Operational Procedures (a new corresponding document). That document is a detailed description of the SEP program implementation describing the Certification Program execution. It is a limited release document for the CAG, Certification Program Manager, and the INCOSE Office Staff and developed by the Certification Program Manager.

Document Change History

The following table identifies each version or issue of this document and provides a description of the purpose or reason for the change. Performing a document comparison between any two versions of this document can identify detailed change differences.

Version	Date	Comment
Version 1.0	09 Apr 2018	Document created from previous OPS PLAN.

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0.0 Executive Summary

As mentioned in the Foreword, the Certification Advisory Group (CAG) approved splitting the previous Certification OPS PLAN document into two separate documents. This is the new CER-PROC-01 INCOSE Systems Engineering Professional (SEP) Certification Program Definition and Requirements document and provides an overview of the SEP program management plan defining the Certification Program and its requirements.

Section 1.0, Introduction contains an overview of the Systems Engineering Professional Certification Program mission, value / objectives, and context. The mission of the SEP Certification Program requires a twofold solution. First, it defines Systems Engineering (SE) task terms that can be used by program managers to specify SE tasks or jobs that need to be done, and second, it recognizes SE personnel who have the capabilities to perform the SE task or job assignments. The objectives of this document are to define certification levels and associated requirements, and to define the organizational responsibilities in managing the Program.

The Certification Program recognizes three levels of systems engineering knowledge and experience. The Associate Systems Engineering Professional (ASEP) provides recognition of SE knowledge based on the INCOSE SE Handbook. The Certified Systems Engineering Professional (CSEP) recognizes those who have demonstrated a baseline of SE knowledge and experience. The Expert Systems Engineering Professional (ESEP) recognizes those who have demonstrated extensive experience and leadership in the practice of systems engineering. The INCOSE Systems Engineering Handbook is the standard reference used for defining systems engineering knowledge. Specific certification requirements and fees are provided in Section 2.0, Program Requirements.

The INCOSE organization is the certifying body. CER-100 INCOSE Professional Certification Program policy defines the structure of the INCOSE Professional Certification Program, including, roles, responsibilities, and terms of office. The Certification Program Office consists of a Certification Advisory Group (CAG), a Certification Program Manager, and a pool of Certification Application Reviewers (CARs). In addition, the Certification Program Manager coordinates with the INCOSE Office Staff in performing the daily activities of the Certification Program. The responsibilities for each party are summarized in Section 3.0, Organizational and Other Resource Responsibilities.

Section 4.0 on Program Coordination and Changes provides an overview on information privacy, certification knowledge providers, memoranda of agreement, and program changes.

- INCOSE will maintain privacy controls over the Certification information as per the INCOSE Policy on Confidential Information.
- To assist both candidates for certification and existing system engineering professionals in their pursuit of increasing domain and application knowledge, INCOSE maintains a list of known knowledge providers who offer material to support preparation for certification applications.

- The Certification Program Manager will work with organizations to establish agreements that assist them in preparing and expeditiously processing their members into the INCOSE Certification Program.
- The Certification Program will do the right thing in fulfilling its commitments, including maintaining certifications and extensions for those who met criteria at the time of their certification. The Certification Program will always give at least six months' notice of major changes.

Finally, the following additional supporting information is available in the appendices: the systems engineering experience areas with key activities and example tasks from the INCOSE SE Handbook (App A), information on candidate's references (App B), qualifying professional development and contribution SE profession activities for ESEP candidates (App C), and SEP recertification (App D).

1.0 Introduction

The Board of Directors (BOD) of the International Council on Systems Engineering (INCOSE) recognized an industry-wide void and in 2002 responded to a request by its members to establish a program to certify the knowledge and experience of personnel who perform systems engineering (SE). This INCOSE-approved Systems Engineering Professional (SEP) Certification Program contains the policies, requirements, and coordination necessary to govern the SE Certification Program. The corresponding INCOSE-approved Operational Procedures for the SE Certification Program contains the processes and procedures to execute and implement the Certification Program.

This program overview provides a summary of the background that led to the development of the operational concept and procedures that INCOSE follows for certifying systems engineering professionals. It also defines the objectives and scope of the Certification Program. Initially, this Certification Program recognized only one level of SE Certification – a foundation level designated the Certified Systems Engineering Professional (CSEP). After gaining experience in operating the program, INCOSE expanded the program to recognize two additional levels of SE capability – the Associate Systems Engineering Professional (ASEP) reflecting knowledge only and the Expert Systems Engineering Professional (ESEP) recognizing extensive experience plus SE leadership.

1.1 Mission

Program Managers throughout industry frequently ask for systems engineers to perform "SE tasks or jobs." Too often in their hurry to get someone immediately, the program manager fails to define what capabilities are required of the requested systems engineers. Another aspect of the personnel problem is the large number of people who are called "Systems Engineers" without there being any standardization in what the title means in terms of: What "SE tasks" are they really capable of performing?

The mission of the Certification Program requires a twofold solution:

- Define SE task terms that can be used by program managers to specify SE tasks or jobs that need to be done, and
- Recognize SE personnel who have the capabilities to perform the SE task or job assignments.

1.1.1 Define "SE Tasks"

Many authors and organizations have published definitions for systems engineering and systems engineering jobs. This Systems Engineering Professional Certification Program uses the following systems engineering definition from the current INCOSE Systems Engineering Handbook.

Systems Engineering is an interdisciplinary approach and means to enable the realization of successful systems.

Achieving commonality in defining "SE Tasks" is a bigger problem because of a tendency to intermix system engineering roles, titles, functions, and tasks. In this Certification Program, evaluations of candidates' systems engineering experience are based on their performance of the tasks identified in Appendix A - Experience Applicable for Certification.

1.1.2 Recognize SE Personnel Capabilities

Defining tasks is only part of the problem in specifying skill sets required for systems engineers. Those who specify or review abilities required for systems engineers are interested in the person's level of systems engineering knowledge. Likewise, they are concerned with the person's systems engineering experience gained from the various types of customers (military, commercial, international), the size of products (total system such as an aircraft weapon system versus a small item such as an electrical connector), and the functional perspective (software, hardware, mechanical, electrical, etc.) of the product developed or the task done.

A program or method for recognizing the SE skill set of individuals needs to account for the person's SE knowledge and experience in applying that knowledge. Industry lacked a standard for identifying and verifying representative systems engineers. In response, INCOSE initiated the systems engineering professional Certification Program described in this plan. The program is achieving three goals defined in "INCOSE Strategic Directions," January 2000, and is responding to INCOSE members' needs. The contributions of the INCOSE systems engineering Certification Program to each of the three INCOSE strategic goals are as follows:

- **Strengthen INCOSE's influence:** The professional SE Certification Program is increasing awareness among professionals, their employers, and their educators of the discipline of Systems Engineering and of INCOSE as the responsible SE professional association.
- **Advance the state of the art and practice of systems engineering:** The professional SE Certification Program is making a significant contribution to the promulgation of existing discipline knowledge and is broadening the base for knowledge flow in the learning-codification-dissemination loop.
- **Promote growth of the INCOSE organization:** SE professional certification is promoting membership in INCOSE as the corresponding professional association that provides the best source of SE contacts and professional expertise.

INCOSE members supported establishment of a Certification Program in their responses to a survey conducted in the first half of 2001. The detailed responses showed a perception that certification will increase the credibility, marketability, and professional status of systems engineers. Respondents also believed that a Certification Program would benefit employers by providing an objective means for selecting candidates and assessing skills. Individuals viewed attainment of certification as an accomplishment, and more than half indicated that they would participate in a Certification Program, notwithstanding a lack of conviction that certification would influence employment. Similar sentiments were re-iterated in a 2003-member survey. This Certification Program continues to be a key aspect of INCOSE's strategic and operating plans.

1.2 Values

The value of the Certification Program is developing a formal process whereby a community of performing skilled representatives, such as INCOSE, warrant that a person has achieved certain skills. Certification differs from licensing in that licenses are permissions granted by a government entity for a person to practice within its regulatory boundaries. Certification also differs from a "certificate" that documents the successful completion of a training or education program.

The objective for the INCOSE Systems Engineering Professional Certification Program is to provide a formal method for recognizing the knowledge, experience, and leadership of systems engineers.

The objectives of this document are to define:

- Certification levels and associated requirements, and
- Organizational responsibilities in managing the Program.

1.3 Context

The INCOSE Systems Engineering Professional Certification Program recognizes individuals who have demonstrated a level of comprehension and proficiency in the systems engineering profession. The Program does not encompass the legal aspects of chartering, licensing, or registering engineers.

The Certification Program recognizes three levels of systems engineering knowledge and experience. The Associate Systems Engineering Professional (ASEP) provides recognition of SE knowledge based on the INCOSE SE Handbook. The Certified Systems Engineering Professional (CSEP) recognizes those who have demonstrated a baseline of SE knowledge and experience. The Expert Systems Engineering Professional (ESEP) recognizes those who have demonstrated extensive experience and leadership in the practice of systems engineering. The INCOSE Systems Engineering Handbook is the standard reference used for defining systems engineering knowledge. Specific certification requirements and fees are provided in Section 2.0, Program Requirements.

The INCOSE Systems Engineering Handbook is the standard reference used for defining systems engineering knowledge. The certification exam was based initially on SE Handbook Version 2A. In 2010, the exam transitioned to using SE handbook Version 3.2 as the standard reference. The certification examination continued to be based on this version of the handbook until 31 December 2015. The Certification Office started testing on the SE Handbook version 4.0 in September 2015, overlapping with the testing on version 3.2. Testing on version 3.2 continued in Germany, China, and Korea until version 4.0 was translated and published in those countries' local languages, which occurred in mid-2017.

English is the official language for all certification related efforts. However, the INCOSE Systems Engineering Professional Certification Program may work with chapters and other entities to provide guides or translations in other languages. If questions arise, the English versions of all items will be the final authority.

1.4 References

1. "INCOSE Systems Engineering Handbook," Version 2A, July 2004.

2. "INCOSE Systems Engineering Handbook," Version 3.1, INCOSE–TP–2003–002–03.1, August 2007.

3. "INCOSE Systems Engineering Handbook," Version 3.2.2, INCOSE-TP-2003-002-03.2.2, October 2011.

4. "INCOSE Systems Engineering Handbook," Version 4.0, Wiley, 2015.

5. "Systems Engineering – System Life Cycle Processes," ISO / IEC / IEEE 15288, 2015.

6. "INCOSE Strategic Directions," January 2000.

7. "Defense Acquisition Guidebook," Chapter 4 Systems Engineering, August 2010.

8. Excerpts from "INCOSE Admin Support Contract," effective February 2018.

2.0 Program Requirements

Section 2.0 on program requirements provides an overview on the certification architecture, the details for each certification level's requirements, and information on the renewal requirements.

2.1 Certification Architecture

The architecture for the SE Professional Certification Program consists of three levels – ASEP, CSEP, and ESEP – that are related as shown in Figure 2-1.

Figure 2-1 Summary Relationships for Three Certification Levels Offered by the INCOSE Certification Program

The Certification Program offers the Associate Systems Engineering Professional (ASEP) (shown in the lower left corner of Figure 2-1) that recognizes individuals who wish to be recognized as knowledgeable but without demonstrated SE experience. The qualification for the ASEP is possession of SE knowledge typical of a junior systems engineer, as evidenced by passing the knowledge exam.

The Certified Systems Engineering Professional (CSEP) (shown in the middle of Figure 2-1) recognizes systems engineering practitioners who have demonstrated knowledge and experience in many aspects of the discipline. The qualifications for this level include education, SE knowledge, and SE experience that serve various job profiles of an experienced, all-round systems engineer.

A CSEP should be capable of carrying out systems engineering tasks in many work situations based on the certified knowledge basis, which includes the insight to recognize domain and role specific practices within the overall context of the systems engineering discipline. Thus, the certified practitioner should be capable of practicing in a broad range of domains including military systems acquisition and development, commercial product engineering, and public infrastructure engineering.

The experience level recognized by the CSEP status is that of a self-sufficient individual who is capable of "finding his own way" to make a productive contribution in most work situations. The prevalent profile to which the CSEP is targeted is that of engineering or equivalent discipline graduates with several years of discipline experience (i.e. electrical, mechanical, software etc.) included within a minimum of five years of SE experience.

The Expert Systems Engineering Professional (ESEP) certification is for those system engineers who have distinguished themselves by demonstrating both substantial experience and technical leadership. This highest level of certification is shown in the upper right corner of Figure 2-1.

2.2 Systems Engineering Certification Requirements

This section provides some background on the knowledge, experience and education, and leadership necessary for a SEP Certification and then defines the requirements for the three levels of certification.

2.2.1 Knowledge, Experience and Education, and Leadership for SEP Certification

2.2.1.1 Knowledge Requirements

INCOSE assesses knowledge in two ways. Candidates for certification must pass a standardized evaluation. ASEP and CSEP candidates take a written, multiple-choice knowledge exam, while candidates for ESEP participate in an oral interview.

- The knowledge exam for ASEPs and CSEPs is developed with the assistance of psychometricians, hosted at computer testing centers through a computer testing provider, offered as paper exams supported by INCOSE staff and volunteers, and scored by either the testing provider, psychometricians, or INCOSE staff.
- Interviews are for ESEP applications. The way INCOSE assesses knowledge for ESEP candidates is an evaluation panel of ESEP Certification Application Reviewers (CARs). They conduct a phone interview with each ESEP candidate.

2.2.1.2 Experience and Education Requirements

The System Engineering experience areas are provided in Appendix A. Certification at the CSEP and ESEP level requires a certain number of years of experience in a determined number of SE experience areas, as well as a balance between the depth and breadth of SE experience in performing some, but not all, SE functions. The amount of experience required depends on the candidate's college education, that is, whether they have a qualifying degree, a non-qualifying degree, or no degree.

A qualifying bachelor's degree or equivalent in the INCOSE Systems Engineering Professional Certification Program is the recognition granted by an accredited college, university or similar institution of higher learning, of successful completion of a minimum four-year course of study of engineering and/or scientific principles and practices applicable to engineering a system. Examples of acceptable engineering fields of study are aeronautics, biomedical, chemical, civil, computer, electrical, environmental, mechanical, nuclear, software, and systems. A qualifying degree must include two courses in calculus and two courses in a physical science with one of the science course having an associated laboratory. Examples of acceptable scientific fields of study are computer science, mathematics, and physics. The Certification Program Office will consider other degrees for acceptability on an individual case basis. The Certification Program Office may request that a candidate submit a copy of his or her transcript of the degree curriculum to assist in determining degree acceptability. To expedite the review in cases where there may be any doubt about the acceptability of the degree, candidates may submit with their application copies of their transcripts that show the courses taken to obtain the degrees.

2.2.1.3 Leadership Requirements

For ESEPs, leadership is assessed. The candidate must have at least five (5) years of post-bachelor's degree professional development and/or leadership contributions to the systems engineering profession. Leadership is a position or function of going before, showing the way, leading, directing, managing, guiding, escorting, coaching, influencing, or directing others to follow.

2.2.2 Certification Fees

Candidates will pay the current fee listed on the INCOSE website with their applications for certification. The fees are non-refundable and are valid for only one year from the date INCOSE receives the application fee. With the exception of paper exams, ASEP and CSEP candidates will pay an additional exam fee (as noted on the INCOSE web site) to the testing organization at the time of scheduling the certification exam. Any exam retake will require an additional exam fee payment from the candidate to the testing organization at the time of scheduling the certification exam retake (again, except for paper exams). Finally, the renewal of existing ASEP and CSEP certification requires submittal of the applicable renewal fee listed on the INCOSE web site.

The INCOSE Certification Office accepts advance payment from organizations to cover the certification application costs for groups of individuals named with the payment. The named employees have one year from the time of the group application payment to complete their

individual certifications that includes submitting the individual application forms and references and scheduling and passing an exam. Group payments do not include fees for scheduling certification exams that must be paid by the employees to the test organization when scheduling the exam to reserve a test seat on the scheduled date. Any portion of the group payment that is unused one year after the candidates are named or payment is received – whichever is later - will be forfeited.

2.2.3 Associate Systems Engineering Professional (ASEP) Certification

The initial ASEP certification is valid for a period of five years. It is renewable for five-year periods. The actual certification period will commence on the date that INCOSE issues the initial certification.

This section defines the criteria and requirements that must be satisfied for obtaining an initial ASEP certification and for renewing an existing ASEP certification.

2.2.3.1 ASEP Requirements

The requirements for recognition as an ASEP are:

- Be an individual INCOSE member in good standing.
- Pass the knowledge exam.
- Meet the continuing education requirements for renewal of ASEP certification at five-year increments.

2.2.3.2 ASEP Transition to CSEP

This section defines the requirements and for transitioning an existing ASEP certification to a CSEP certification.

Those who have achieved ASEP recognition may transition to CSEP by completing the CSEP experience requirements, defined in section 2.2.4.1, and submitting the CSEP application along with the requisite fee for gaining CSEP recognition. The fee for the transition application is listed on the INCOSE web site. No additional examination is required for this transition.

2.2.4 Certified Systems Engineering Professional (CSEP) Certification

The initial CSEP recognition is valid for a period of three years. It is renewable for three-year periods, with no limit to the number of times it may be renewed. The actual certification period will commence on the date that INCOSE issues the initial certification.

This section defines the criteria and requirements that must be satisfied for obtaining an initial CSEP certification and for renewing an existing CSEP certification.

2.2.4.1 CSEP Requirements

The requirements for recognition as a CSEP are:

- Be an individual INCOSE member in good standing (required for all who submit application payment after 31 December 2015).
- Pass the knowledge exam.
- Five (5) years systems engineering experience with a qualifying degree. If lacking a qualifying degree, the following is required:
  - With a non-qualifying Bachelor's degree: 10 years of engineering experience is required, of which a minimum of 5 years must be SE experience
  - With no Bachelor's degree: 15 years of engineering experience is required, of which a minimum of 5 years must be SE experience
- Have at least three (3) qualified references (see Appendix B) who:
  - With a qualifying degree: validate a combined minimum of 5 years SE experience.
  - Without a qualifying degree: validate a combined minimum of 10 years of engineering experience of which a minimum of 5 years must be SE experience.
- Meet the continuing education requirements for renewal of CSEP certification at three-year intervals.

To achieve the desired depth and breadth in the minimum 5 years of SE experience, the CSEP candidate must have at least one year of SE experience in each of three or more of the systems engineering experience areas listed in Appendix A.

2.2.5 Expert Systems Engineering Professional (ESEP) Requirements

The ESEP certification is valid as long as the recipient maintains individual INCOSE membership. The actual certification will commence on the date that INCOSE issues the certification. Renewal is not required as long as INCOSE membership is maintained.

This section defines the criteria and requirements that must be satisfied for obtaining an ESEP certification.

2.2.5.1 ESEP Requirements

The requirements for recognition as an ESEP are:

- Be an individual INCOSE member in good standing.
- Pass an oral review (typically not exceeding one hour) by the ESEP evaluation panel (the review will be by phone).
- Twenty-five (25) years systems engineering experience with a qualifying degree (twenty (20) years if a CSEP). If lacking a qualifying degree, additional engineering experience may be substituted as follows:
  - If a current CSEP
    - With a non-qualifying Bachelor's degree: 25 years of engineering experience is required, of which a minimum of 20 years must be SE experience
    - With no Bachelor's degree: 30 years of engineering experience is required, of which a minimum of 20 years must be SE experience

  - If not a current CSEP
    - With a non-qualifying Bachelor's degree: 30 years of engineering experience is required, of which a minimum of 20 years must be SE experience
    - With no Bachelor's degree: 30 years of engineering experience is required, of which a minimum of 20 years must be SE experience
- Have at least three (3) qualified references (see Appendix B) who validate a combined minimum of 10 years SE experience. They must be willing to participate in an oral review (typically not exceeding thirty minutes) in the English language by an ESEP evaluation panel (the review will be by phone).
- In order to ensure a sound systems engineering technical foundation, the systems engineering experience is to be in two-year or greater increments in at least six of the systems engineering experience areas defined further in Appendix A. The increments need not be continuous.
- Have at least five (5) years of post-bachelor's degree professional development and/or leadership contributions to the systems engineering profession. Leadership is a position or function of going before, showing the way, leading, directing, managing, guiding, escorting, coaching, influencing, or directing others to follow. These years of development and/or leadership may be acquired concurrent with or in addition to the years of systems engineering experience.

2.3 Renewal Requirements

For a certification to remain valid, it must be renewed every 5 years for an ASEP and 3 years for a CSEP. For a renewal application to be valid and processed, it must be dated (electronic or post-marked) no later than the expiration date of the current certification. For example, if the candidate received his or her certification on August 16, 2005, then his or her certification expires on August 15, 2008; and the renewal application must be dated (electronic or post-marked) no later than August 15, 2008.

Renewal requires confirmation of attaining 120 professional development units (PDUs) of continuing education and development requirements during the prior three (CSEP) or five (ASEP) years. Typically, one PDU is earned for each hour spent in a qualified educational activity. Appendix D defines possible sources of continuing education and development to earn the 120 professional development units required for triennial certification renewal and provides further information about how to meet the continuing education and development requirements. As long as their status remains valid, the successful candidates will be authorized by INCOSE to use the ASEP or CSEP designation.

As shown in Table 2-1 through 2-3, renewal applications that are dated (electronic or post-marked) after the expiration of the current certification will be subject to additional PDUs.

Months after expiration date	Reactivation fee	Additional PDUs
<= 0	none	none
0 to 6	50	12
6 to 12	100	24
>= 12	150	24 per year expired

Table 2-1 ASEP Late Renewal Requirements

All ASEP renewals greater than or equal to 12 months may renew with PDU submissions or may pass exam and pay reactivation fee of $150 once their INCOSE membership is reactivated (if expired). Continuous individual INCOSE membership is required for all ASEPs.

Months after expiration date	Reactivation fee	Additional PDUs
<= 0	none	none
0 to 6	50	20
6 to 12	100	40
>= 12	150	40 per year expired

Table 2-2 CSEP Late Renewal Requirements

All CSEP renewals greater than or equal to 12 months may renew with PDU submissions or may pass exam and pay reactivation fee of $150 once their INCOSE membership is reactivated. Experience and education documents need not be resubmitted, and CARs will not reassess someone who had already previously been approved as a CSEP. Individual INCOSE membership is not required for non-member CSEPs (who paid their CSEP application fees prior to 2016) who renew on time. It is required for all other renewals.

Months after expiration date	Reactivation fee
<= 0	none
0 to 6	50
6 to 12	100
>= 12	150

Table 2-3 ESEP Late Renewal Requirements

ESEPs must pay the reactivation fee to renew once their INCOSE membership is reactivated. Experience and education documents need not be resubmitted, and CARs will not reassess someone who had already previously been approved as an ESEP. Continuous individual INCOSE membership is required for all ESEPs.

Individuals who do not submit their completed renewal form, fee, and log of PDU activities will be subject to additional fees and/or have to re-start the certification process. We have created a grace period to accommodate special cases. That grace period is described below:

- Prior to the renewal deadline: submit renewal form, renewal fee, and log showing 120 or more PDUs
- If within 6 months after deadline: submit renewal form, renewal fee, reactivation fee, and log showing 140 or more PDUs
- If greater than 6 months but less than 12 months after deadline: submit renewal form, renewal fee, reactivation fee, a new reference to verify 12 months of SE work since your last application, and a log showing 160 or more PDUs
- If greater than 12 months past renewal deadline: start over in certification process, taking the knowledge exam and submitting new application materials and fees
- All late renewals will also require INCOSE memberships to be active.
- Late renewals will re-start the certification time window, with subsequent renewal deadlines based on that renewal date.

SEPs who attempt to renew after the end of their grace period will have to repeat the entire certification process to regain SEP status. Applications for renewal of existing certifications are made by using the two online forms (renewal application and log of continuing education) that are available on the INCOSE web site. Electronic submittal of these forms is strongly preferred in processing renewal applications.

Except for those CSEPs who paid applications fees prior to 2016, all SEPs must maintain INCOSE membership to remain certified. Discontinuity of INCOSE membership is grounds for expiration of INCOSE certification. A SEP who maintains INCOSE membership may put his or her certification “on hold” by contacting the INCOSE certification office with that request. The certification may be put “on hold” indefinitely. The SEP may not claim certification status

during the hold period. At the end of the hold period, the SEP may re-open his or her certification for the remaining period of certification prior to renewal. The re-opening fee will be the same as the penalty for renewal up to six months after certification expiration.

2.4 Requirements Summary

Table 2-4 is the summary of the Systems Engineering Professional Certification Requirements.

REQUIREMENTS		ASEP	CSEP	ESEP	
INCOSE Member		Good Standing	Good Standing *	Good Standing	
Knowledge		Examination	Examination	Oral Interview	
Total Professional Level Experience Required				**Current CSEP**	**Not Current CSEP**
	With Qualified Degree	N/A	A minimum of 5 years SE experience	A minimum of 20 years SE experience	A minimum of 25 years SE experience
	With Non-Qualifying Degree	N/A	10 years of which a minimum of 5 years must be SE experience	25 years of which a minimum of 20 years must be SE experience	30 years of which a minimum of 25 years must be SE experience
	With No Degree	N/A	15 years of which a minimum of 5 years must be SE experience	30 years of which a minimum of 20 years must be SE experience	35 years of which a minimum of 25 years must be SE experience
SE Experience Distribution		N/A	At least 1 year in each of 3 or more experience areas	At least 2 years in each of 6 or more experience areas	
References for Candidates	**With Qualified Degree**	N/A	3 persons validating a combined minimum of 5 years SE experience	3 persons validating a combined minimum of 10 years SE experience; must be willing to be interviewed	
	Without Qualified Degree	N/A	3 persons validating a combined minimum of 10 years of experience of which a minimum of 5 years must be SE experience	3 persons validating a combined minimum of 10 years SE experience; must be willing to be interviewed	
Leadership		N/A	N/A	At least 5 years of leadership in experience areas, technical societies, or teaching (see application)	
Renewal		5 years	3 years	N/A - Lifetime	

FOOTNOTES: ** - Membership is required for candidates who paid certification application fees on 1 January 2016 or later.*

Table 2-4 Systems Engineering Professional Certification Requirements

2.5 Candidate Appeals

A candidate can appeal the denial of his or her application for certification or the removal of his or her existing certification. The appeal is an appeal about the evaluation process, not an opportunity to submit additional evidence or material. Appeals are decided by the Certification Advisory Group.

In all denial cases, INCOSE will maintain privacy controls over the Certification information as per the INCOSE Policy on Confidential Information, including properly and securely disposing of all confidential and/or private certification information that comes into their possession.

2.6 Certification Extensions

INCOSE has previously offered an extension to certification. Retired in 2013, the Acquisition extension was based on the US Defense Acquisition Guidebook, Chapter 4. The purpose of an extension is to measure a specific knowledge within or related to systems engineering. An acquisition may be related to a specific domain, such as US defense, or a specific type of systems engineering, such as system security. The format of the Acquisition extension was a one-hour (60-item) exam, which could only be taken by someone who had already passed the knowledge exam or been certified as an ESEP. It was anticipated that US defense contractors would want to participate in the Acquisition extension and that that interest would draw them into the INCOSE Certification Program. The considerations before approving another will be focused on the business case, but even prior to that there must be a published body of knowledge for the exam.

When evaluating the business case, the demand for a new extension plus the increase in demand for the core certification based on the addition of the new extension must meet or exceed the investment resources. Those resources include both financial costs for staff labor and contractors as well as demands on volunteer labor. Some of the fixed costs are those for exam creation and exam maintenance, while ongoing costs also exist related to marketing and mitigating confusion between the multiple exams.

2.7 Certification Equivalencies

INCOSE's Certification Program seeks to identify and approve equivalent ways to meet the Certification Program requirements, especially as they reach a new audience not already engaged by the standard INCOSE Certification Program. The first equivalency, approved in 2011, is the SE-ZERT established in conjunction with the Gesellschaft für Systems Engineering (GfSE). Since then, MOAs with INCOSE UK and the Systems Engineering Society of Australia (SESA) have filled in the space between the standard process and a completely independent one like SEZERT. Candidates who gain equivalent certifications may apply through their certifying body to be recognized as INCOSE SEPs for a small fee.

Table 2-5 on Certification Equivalencies is current as of 9 April 2018.

CERTIFYING BODY	KNOWLEDGE	EDUCATION	EXPERIENCE
INCOSE	Multiple-choice exam	Proof of degree	Documented months
SE-ZERT	Classroom exams	Government record	Government record
INCOSE UK	Multiple-choice exam	Proof of degree	Evolving to competency interview
CASE	Multiple-choice exam	CPEng evaluated	CPEng + supplement

Table 2-5 Certification Equivalencies

3.0 Organizational Responsibilities

Section 3.0 on organizational and other resource responsibilities provides an overview on the program structure and the certification organization.

3.1 Program Structure

CER-100 INCOSE Professional Certification Program policy defines the structure of the INCOSE Professional Certification Program, including, roles, responsibilities, and terms of office. The INCOSE Professional Certification Program recognizes individuals who have demonstrated a comprehension of systems engineering principles and proficiency in systems engineering practices. This program does not encompass the legal aspects of chartering, licensing, or registering engineers. The INCOSE organization is the certifying body.

CER-100 includes sections on authority and responsibilities, terms of office for program participants, confidentiality, certification appeals, and certification complaints.

3.2 Certification Organization

Per CER-100, the INCOSE Board of Directors provides oversight of the Professional Certification Program. The Certification Program Office is responsible for implementing the SE Professional Certification Program with contractually provided Program Management, Office Staff, and Test Support. Members of Technical Operations assist the Certification Program Office in providing the basis for the certification exam (that is, the INCOSE Systems Engineering Handbook).

3.2.1 Certification Program Office

The Certification Program Office consists of a Certification Advisory Group (CAG), a Certification Program Manager, and a pool of Certification Application Reviewers (CARs). The responsibilities for each party are described in CER-100 and summarized here. The CAG is responsible for recommending policy revisions, advising the Board of Directors, and adjudicating unusual application reviews. The Certification Program Manager reports to the INCOSE President-Elect on all certification-related contractual, programmatic, and deliverable issues, working with the CAG and BoD as directed by the President-Elect. The Certification Program Manager oversees implementation of the Certification Program policies and development of procedures and manages external relationships with Test Support and Memorandum of Agreement organizations. All members of the Certification Program Office (that is, the CAG, Certification Program Manager, and CARs) shall be currently active INCOSE members in good standing who are Certified Systems Engineering Professionals or Expert Systems Engineering Professionals.

The Certification Program Office is responsible for:

- Developing policies and procedures, as needed, to implement the Certification Program.

- Reviewing the Certification Program's performance annually and recommending improvements to the Board of Directors for approval.
- Marketing the Certification Program to the individuals, companies, organizations, and the community that practice systems engineering.
- Establishing relationships with other organizations for providing certification services and/or cross-recognition of programs.
- Processing applications for systems engineering certification and renewals, and granting certification to those who satisfy the eligibility requirements.

3.2.2 Certification Advisory Group

The Certification Advisory Group (CAG) is composed of nine individuals who provide a reasonable representation of the INCOSE membership in terms of geographical distribution, areas of systems engineering expertise, product orientation (commercial and military), and organizational focus (industry, government, and academic). Eligibility requirements for CAG membership are: current individual INCOSE membership; current ESEP certification; and CAR experience. The CAG is responsible for establishing certification-related policies.

Per CER-100 "INCOSE Professional Certification Program" Policy, CAG personnel are appointed to their roles. CAG Members are recommended by the CAG, nominated by the CAG Chair, and appointed by the INCOSE Board of Directors for a 3-year term. From the CAG Members, the CAG Chair, CAG Co-Chair, and CAG Recorder are elected to their positions for a 1-year term. The CAG Co-Chair proceeds to the CAG Chair position.

3.2.3 Certification Program Manager

The Certification Program Manager will be hired under a renewable two-year contract by the INCOSE Board of Directors, will be responsible to the INCOSE President-Elect, and will interface with the CAG for the daily operation of the Certification Program Office. The Certification Program Manager is responsible for:

- Performing daily operations in conjunction with Office Staff to implement the Certification Program described in this document.
- Preparing and submitting an annual budget for the Certification Program Office to the CAG and INCOSE Board of Directors
- Providing periodic status reports to the CAG and Board of Directors on the Certification Program
- Conducting efforts to publicize and market the Certification Program
- Monitoring, measuring, and reporting on the effectiveness of the certification process
- Maintaining records of all certification activities not kept by Office Staff
- Obtaining signatures on volunteer agreements by those who agree to serve as CARs and forwarding the agreements to Office Staff for retention.
- Ensuring that reviews and approvals or denials of certification candidates are completed by the CAR Teams in a timely manner
- Reporting to candidates and Systems Engineering Professionals

- Ensuring satisfactory interfaces and services to all clients of the Certification Program
- Selecting a portion of the renewal applications annually for quality checks on the continuing education courses and other professional development activities.
- Interfacing with Test Support to resolve any problems or to introduce any improvements relative to the content and administration of the certification exam.

3.2.4 Certification Applicant Reviewers (CARs)

Each certification application is evaluated by CARs assigned by the INCOSE Office Staff on a rotating basis from the list of available CARs. CARs sign volunteer agreements related to data privacy and complete annual refresher training on program policy, to ensure secure and consistent reviews.

3.2.5 INCOSE Office Staff

The INCOSE Office Staff is provided as a contract service arranged by the INCOSE Board of Directors. The Certification Program Manager coordinates with the office staff in performing the daily activities of the Certification Program which include the following types of tasks related to certification: General Administrative, Data Management, Reporting, Application Phase, Staff Actions Phase, Evaluation Phase, Expiration, Renewal, and Extensions.

3.2.6 Test Support

Test support is provided as a contract service arranged by the INCOSE Board of Directors. A member of the Office Staff coordinates with Test Support in performing the daily activities of the Certification Program. Test Support is responsible for:

- Providing the INCOSE Office Staff with current lists of locations where certification exams may be taken
- Scheduling and administering certification exams when contacted by certification candidates authorized by INCOSE Office Staff
- Sending certification exam scores for authorized candidates within one week of the exam to the INCOSE Office Staff
- Assisting the Certification Program Office in periodically updating the certification exam
- Publishing and distributing the certification exams with item banks supplied by the Certification Program Office.

4.0 Program Coordination and Changes

Section 4.0 on program coordination and changes provides an overview on information privacy, certification knowledge providers, memoranda of agreement, and program changes.

4.1 Information Privacy

INCOSE will maintain privacy controls over the Certification information as per the INCOSE Policy on Confidential Information.

INCOSE will maintain a list of the names, geographic areas (organization and unit, city, state, and country), and certification time periods of those recognized as Associate, Certified, and Expert System Engineering Professionals on its web site. No personal information will be published with the list of names. Information listed is that provided by candidates, who may update the information by emailing certification@incose.org.

4.2 Certification Training Providers

In order to assist both candidates for certification and existing system engineering professionals in their pursuit of increasing domain and application knowledge, INCOSE maintains a list of known training providers who offer material to support preparation for certification applications. This list is available by request from the Certification Office. INCOSE does not endorse any specific providers at this time.

4.3 Dissemination of Information about the Certification Program

Information abstracted from this document has been assembled on the INCOSE Certification web page and is periodically updated to provide the latest certification information to the public. The information selected is that judged to be of interest to an individual who may want to apply to become an Associate, Certified, or Expert Systems Engineering Professional. The information is accessible via an information menu and a very simple “point and click” process.

4.4 Memoranda of Agreement

The Certification Program Manager will work with organizations to establish agreements that assist them in preparing and expeditiously processing their members into the INCOSE Certification Program. The Certification Program Manager will prepare draft agreements with candidate organizations, will submit the draft agreements to the CAG for review, and will then obtain the approval of the President and President-Elect of INCOSE to the agreements.

4.5 Program Changes

The Certification Program will do the right thing in fulfilling its commitments, including maintaining certifications and extensions for those who met criteria at the time of their

certification. This has been demonstrated twice when significant program changes were made. When the Acquisition extension was retired, all current –Acq's were allowed to keep their certification. When individual membership became a requirement at the CSEP level, current CSEPs were not required to join INCOSE to maintain their certifications.

The Certification Program will always give at least six months' notice of major changes. When the exam body of knowledge changes, there will typically be a one-year notice of intent to change, along with at least six months' notice of the exact date of the transition. Similarly, old versions of application forms are allowed to be used for 12 months after new forms are released. The Certification Program Office recognizes that many candidates spend multiple months preparing their application forms and studying for the exam, and there is no intent to disrupt that through changes to the Certification Program documentation requirements. When a translated version of the handbook exists, candidates who use that translation will be allowed six months after a new translation is released before they are required to switch to a new version of the knowledge exam.

Appendix A - Experience Applicable for Certification

Candidates for recognition as a CSEP or ESEP are required to submit evidence of a minimum of five years (CSEP) or twenty-five years (ESEP) of systems engineering experience in addition to having a qualifying degree. Candidates who have the minimum five years of SE experience but who lack a qualifying degree may submit an additional five years of engineering experience with a non-qualifying degree, or an additional ten years of engineering experience in lieu of no degree. (The additional years of engineering experience may, but are not required to, be in systems engineering.) Systems engineering experience to satisfy the minimum requirements for initial certification includes performing paid or volunteer work in systems engineering areas but does not include time spent in receiving a technical education. (Teaching experience may be included to satisfy re-certification requirements but lecturing full-time will not demonstrate sufficient breadth of experience.)

Systems engineering experience should be mapped to the following areas:

A.1 Requirements Engineering

Systems Engineering Area	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
Requirements Engineering	Preparing for Business or mission analysis	e.g. Establishing an organisational strategy
	Defining the Problem or opportunity space	e.g. Reviewing gaps in organizational strategy regarding desired organisational goals; Analysing gaps across trade space; Describing problems or opportunities underlying the gaps; Obtaining agreement
	Characterising the solution space	e.g. Nominating key stakeholders; Defining preliminary OpsCon; Defining preliminary life Cycle concepts
	Evaluating Alternative solution classes	e.g. Modelling, simulating, determining feasibility and selecting solution classes; Validating in context of business or mission strategy e.g. feasibility, market feedback
	Managing the business or mission analysis	e.g. Establishing and maintaining traceability; Providing baseline for Configuration Management, developing organisational competence and/or associated tools in this area
	Preparing for Stakeholder Needs & Reqts Definitions	e.g. Determining stakeholder (classes); Determining who will participate and capture in ConOps
	Defining stakeholder needs	e.g. Eliciting from identified stakeholders; Prioritizing stakeholders; Specifying the
	Developing Operational Concept and other Life Cycle concepts	e.g. Identifying scenarios, capabilities, behaviours and system responses reflecting lifecycle usage, operational environment identifying interfaces
	Transforming needs into stakeholder requirements	e.g. Identifying solution constraints (e.g. legacy); Specifying health, safety, security, environment, assurance relating to critical qualities; Specifying stakeholder requirements consistent with scenarios and critical qualities
	Analyzing Stakeholder Requirements	e.g. Defining validation criteria for requirements (e.g. (MoE, MoP); Analyzing for quality, clarity, completeness and consistency; Reviewing with stakeholders; Negotiating unreasonable requirements
	Managing stakeholder needs and reqts definition	e.g. Establishing with stakeholders requirements are expressed correctly; Recording in a manner suitable for maintenance; Establishing and maintaining traceability; Providing baseline information for Configuration Management
	Preparing for System Requirements Definition	e.g. Establishing approach (methods, enabling systems, Requirements Management Plan) in conjunction with architectural design determining system boundary, and its interfaces – reflecting system behaviours and operational scenarios; Identifying interaction with external systems, negotiated in ICDs
	Defining System Requirements	e.g. Identifying required implementation-independent system functions including design factors that facilitate efficient lifecycle factors and system behaviour; identifying and capturing unavoidable (stakeholder) constraints or limitations; identifying critical quality characteristics (safety, security, reliability, supportability); identifying technical risks)
	Analyzing System Requirements	e.g. Analyzing the integrity of the requirements individually and as a set; Providing analysis results to stakeholders to ensure requirements adequately reflect stakeholder requirements; Negotiating modifications to resolve issues identified; Defining verification criteria, including MOPs, TPMs reflecting MOEs and MOSs
	Managing System Requirements	e.g. Ensuring agreement among stakeholders that requirements reflect intentions; Establishing and maintaining traceability and control between requirements and relevant elements of the system definition and maintaining throughout the lifecycle; Requirements allocation; Providing baseline information for configuration management, developing organisational competence and/or associated tools in this area

A.2 Systems and Decision Analysis

Systems Engineering Area	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
Systems and Decision Analysis	Preparing for system analysis	e.g. Defining analysis scope, evaluation criteria, analysis strategy and methods; Defining and acquiring enabling systems
	Performing System Analysis	e.g. Collecting/Modelling, analysing and peer reviewing analysis data
	Managing System Analysis	e.g. Baselining and maintaining analysis history data, developing organisational competence and/or associated tools in this area
	Preparing for System Engineering Decisions	e.g. Defining a strategy for the system; Establishing and challenging the decision-making statement; Clarifying terminology (e.g. buying a car…What car? What vehicle?)
	Analyzing the system engineering decision information	e.g. Framing, Tailoring and structuring the decision; Developing Objectives and Measures; Generating Creative Alternatives; Assessing alternatives via deterministic analysis;
	Making and managing SE decisions	e.g. Recording the decision and associated data; Communicating new directions from the decision

A.3 Architecture / Design Development

Systems Engineering Area	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
Architecture/ Design Development	Preparing for architecture definition	e.g. Identifying market; Stakeholders and their concerns; Analyzing system requirements; Tagging key non-functional requirements, Defining approach and evaluation criteria, Ensuring enabling system elements are available
	Developing architecture viewpoints	e.g. taking stakeholder concerns and establishing models to facilitate understanding and
	Developing models and views of candidate architectures	e.g. Applying supporting techniques; Defining Context, Defining External interactions; Defining architectural entities; Defining Attributes; Defining Candidate architecture;
	Relating Architecture to design	e.g. identifying notional system elements partitioning - reflecting requirements; Optimising; Allocating requirements to elements; Defining/refining internal interfaces;
	Assessing candidate architectures	e.g. Using evaluation criteria, planning, performing and documenting trade studies, selecting preferred architecture
	Managing the Selected Architecture	e.g. Documenting: Capturing decisions and rationale; Maintaining evolving architecture; Establishing architectural governance; Coordinating architectural review to obtain stakeholder agreement vs. requirements
	Preparing for design definition	e.g. Identifying and planning technology obsolescence or upgrade; Identifying design characteristics for each system element; Evolving design with architecture; Defining design strategy, including requirements for enabling systems
	Assessing alternatives for obtaining system elements	e.g. Identifying existing elements and assessing options using selection criteria from design characteristics; Selecting best alternatives; Designing or Acquiring Elements
	Establishing design characteristics and design enablers	e.g. Establishing design characteristics and design enablers related to each system element; Performing requirements allocation for requirements and elements not fully addressed in architecture; Defining design characteristics for architectural entities and assessing alternative designs or trades; Performing interface definition for interfaces not defined in the architectural definition process or which need refining as the design evolves; Capturing design characteristics for system elements; Providing rationale on
	Managing the system design	e.g. Capturing and maintaining decisions and rationale; Managing the maintenance and evolution of design and alignment architecture, developing organisational competence and/or associated tools in this area

A.4 Systems Integration

Systems Engineering Area	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
Systems Integration	**Preparing, Performing and Managing system element implementation**	e.g. Professional-level activities in the area of systems engineering in support of preparation for the implementation of a system or product, or supporting and managing the implementation of a system or product
	Preparing for Integration	e.g. Defining/Preparing a Strategy, Developing Integration Plans, Defining Constraints and Enabling Systems; Developing test scenarios and associated test scripts
	Performing Integration	e.g. Assembling incremental aggregates, using ICDs and enabling systems; Conducting and documenting integration tests, Verifying Architecture and design
	Managing integration results	e.g. Recording results, recording anomalies and establishing traceability; Tracking test results and retest status, Co-ordination with PM, developing organisational competence and/or associated tools in this area
	Identifying, Agreeing and Managing interfaces	e.g. defining, optimising and agreeing Functional and Physical aspects of interfaces; negotiating interface ownership, functionality and performance with suppliers and partners; managing interface design and development lifecycle, developing organisational competence and/or associated tools in this area

A.5 Verification and Validation

Systems Engineering Area	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
Verification and Validation	**Preparing for Verification**	e.g. Preparing a Strategy and Scope, Developing Verification Plans, Identifying pass/fail criteria, Writing procedures, Defining a schedule, Defining Enabling Systems
	Performing Verification	e.g. Implementing Verification testing, Analysing results
	Managing results of Verification	e.g. Preparing/Maintaining RVTM, Recording results, Recording/resolving anomalies; establishing bidirectional traceability; Baselining for CM; Coordinating/Updating strategy with PM, developing organisational competence and/or associated tools in this area
	Preparing for Validation	e.g. Identifying/Involving Stakeholders, Defining a Validation strategy and constraints, Developing Validation Plans, Identifying pass/fail criteria, Writing procedures, Identifying Risks, Identifying /Acquiring Enabling systems, Providing V&V evidence in support of
	Performing Validation	e.g. Developing procedures and Schedule, Executing procedures; Analyzing results, Recording anomalies and tracking updates, Achieving Validation and Qualification
	Managing results of Validation	e.g. Preparing/Maintaining RVTM, Recording results, Recording/resolving anomalies maintaining bidirectional traceability; Baselining for CM; Obtaining stakeholder
	Preparing for the Transition	e.g. Defining a Strategy, Defining logistics, Defining installation procedures, Defining/Acquiring enabling systems
	Performing the Transition	e.g. Installing a system, training users, confirming system provides functionality (Supporting "Acceptance"
	Managing results of Transition	e.g. Capturing incidents, capturing problems and anomalies; Maintaining traceability; Baselining information for CM, including developing organisational competence and/or

A.6 System Operation and Maintenance

Systems Engineering Area	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
System Operation and Maintenance	Preparing for Operation	e.g. Defining a Strategy, Performing system safety training, Feeding back operational constraints into design, identifying/Acquiring enabling systems; Identifying operator skill
	Managing results of Operation	e.g. Activities in accordance with OpsCon. Professional activities associated with documenting, recording and resolving operational anomalies, Maintaining traceability, developing organisational competence and/or associated tools in this area
	Performing and Supporting System/Product Operation	e.g. Professional activities associated with operating and supporting system/product operation such as Tracking performance, availability, non-compliances
	Preparing for Maintenance	e.g. Defining a Strategy and Constraints, Defining Maintenance Types levels, Defining/Acquiring enabling systems and training personnel
	Performing Maintenance	e.g. Professional activities associated with Writing/Executing Procedures, identifying/resolving anomalies; restoring operation after failure, performing corrective actions, performing preventative/perfective maintenance
	Performing Logistics Support	e.g. Professional activities associated with support, developing organisational competence and/or associated tools in this area
	Managing results of maintenance and logistics	e.g. Professional activities associated with Documenting, recording/ resolving anomalies/trends, maintaining traceability, obtaining Customer feedback
	Preparing for disposal	e.g. Defining a Strategy and Constraints, Defining/Acquiring Enabling systems, Defining reuse/recycling of hazardous materials, Defining special containment processes
	Performing the disposal	e.g. Professional activities associated with Decommissioning, Disassembling, Removing waste and Consigning for destruction/ storage, developing organisational competence and/or associated tools in this area
	Finalizing the disposal	e.g. Professional activities associated with assessment of decommission (e.g. adverse affects); Professional activities associated with maintaining documentation e.g. for

A.7 Technical Planning

Systems Engineering Area	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
Technical Planning	Defining the SE project	e.g. Analyzing proposals and agreements to define objectives, scope and constraints; Establishing project strategy and tailoring required; Establishing SE Work Breakdown Structure (WBS) based upon (evolving) architecture; Defining system life cycle model (from those defined organizationally), including SE milestones, gates and reviews
	Planning the SE project and SE technical management and Activating the project	e.g. Tailoring enterprise processes for program/project use; Establishing SE roles and responsibilities; Defining top-level SE work packages; Developing SE project schedule; Defining required SE infrastructure & services; Defining SE costs and estimate budget; Planning usage of personnel and facilities and the acquisition of materials, goods and enabling systems; Preparing System Engineering Management Plan (SEMP) or Systems Engineering Plan (SEP) and Integrated Master schedules, Tailoring plans (e.g. QM, CM, RM and IM, Measurement) to reflect project SE; Establishing criteria for SE milestones, gates and internal reviews, Establishing project performance measures, developing organisational competence and/or associated tools in this area; activating the project
	Identifying and recording tailoring influences and mandated structures	e.g. Identifying tailoring criteria for each stage; Establishing criteria which determine the process level that applies to each stage; Taking due account of the lifecycle structures recommended or mandated by standards
	Obtaining input from parties affected by the tailoring strategy	e.g. Determining process relevance to cost, schedule and risks, system integrity, Determining Quality of documentation needed; Determining extent of review, Defining coordination and decision methods
	Making Tailoring decisions and Selecting life cycle processes	e.g. Making tailoring decisions, determining processes that require tailoring (including any changes required to meet org or project needs beyond tailoring (e.g. additional tasks

A.8 Technical Monitoring and Control

Systems Engineering Area	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
Technical Monitoring and Control	**Planning for SE project assessment and control**	e.g. .Developing an SE strategy for project assessment and control
	Assessing SE projects	e.g. Reviewing measurement results for the project; Determining actual and predicted cost/time and deviations in project quality; Evaluating system performance, effectiveness and efficiency of activities; Ensuring SE resource adequacy and availability; Evaluating SE progress against milestones; Conducting system reviews, audits, inspections to determine readiness for next milestone; Monitoring SE critical tasks and technologies; Analyzing assessment results; Making recommendations for SE plan changes and other decision making processes; Communicating SE status
	Controlling projects from SE perspective	e.g. Initiating…; preventative actions for adverse trends; problem resolution for non-conformances; corrective actions for deviations from plans; Reflecting changes in new SE work items or schedule; Negotiating with external suppliers for good and services; Making decisions to proceed or not at gate / milestone events, developing organisational competence and/or associated tools in this area
	Preparing for Measurement	e.g. Identifying measurement stakeholders and their needs; Developing a measurement strategy; Selecting relevant prioritized measures that aid with management and technical performance; Defining base measures, derived measures, indicators, data collection methods, frequency, repository, reporting methods, trigger points and review authorities
	Performing System Measurement	e.g. Gathering, processing, storing, verifying and analysing metrics and SE data to obtain measurement results (information products) and key performance parameters; conducting capability assessments; Documenting and reviewing with stakeholders; Recommending action if required, developing organisational competence and/or associated tools in this area
	Preparing for system quality assurance	e.g. Establishing and maintaining QA strategy (in QA Plan or within SEMP); Establishing and maintain guidelines policies, standards and procedures, assessing process and tool usage compliance; Defining SE/QA responsibilities and authorities
	Performing system product or service evaluations	e.g. Performing Quality Audits and product evaluations at appropriate times in the life cycle and defined in QA plan, reporting quality audits, defining and tracking improvement recommendations; Ensuring V&V of process outputs, Recommending process improvements; Ensuring QA perspective is represented during development activities, developing organisational competence and/or associated tools in this area, Evaluating product verification results as evidence of QA effectiveness

A.9 Acquisition and Supply

Systems Engineering Area	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
Acquisition and Supply	**Preparing for system/element acquisition**	e.g. Developing plans, policies to meet strategic goals; Identifying needs (e.g. in Request for Proposal (RFP) or Request for Quotation (RFQ)); Identifying potential suppliers, developing organisational competence and/or associated tools in this area
	Advertising the acquisition and select the supplier	e.g. Distributing the request (e.g. RPF, RFQ); Selecting appropriate suppliers using selection criteria and preferences; Evaluating supplier responses; Understanding PM and QM perspectives; Recording recommendations; Selecting preferred supplier
	Establishing and maintaining an agreement	e.g. Negotiating agreement including acceptance criteria
	Monitoring the agreement	e.g. Managing acquisition process (e.g. Relationships, supplier Interactions); Ensuring final authority approvals for deliveries accepted from supplier; Maintaining communications; Reporting Status progress against schedule; Amending Agreements
	Accepting the product or service	e.g. Complying with agreement and laws; Rendering payment (or other considerations); Accepting responsibility; Performing final review and lessons learned
	Preparing for the supply	e.g. Develop strategy, policies etc. to meet needs of potential acquirers; Identifying opportunities, developing organisational competence and/or associated tools in this area
	Responding to a tender	e.g. Selecting appropriate acquirers; Evaluating acquirer requests and Proposing solution meeting needs; Assessing suitability from PPM, HR,QM and BMA perspectives
	Establishing and maintaining an agreement	e.g. Establishing acceptance criteria; Committing to agreed requirements, milestones, payments
	Executing the agreement	e.g. Starting the project; Managing the supply process (Decision making, relationship building, interaction with organizations, defining responsibilities, approval authorities); Maintaining communications; Evaluating agreement (e.g. risks and issues)
	Delivering and supporting the product or service	e.g. After acceptance and transfer of final product/service accept payment from acquirer; When supplying cycle concludes, performing final review to extract lessons learned

A.10 Information and Configuration Management

Systems Engineering Area	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
Information and Configuration Management	**Planning configuration management**	e.g. Creating a CM strategy (plan in CM/SEMP Plan); Implementing a configuration control cycle for ECRs (evaluation, approval, validation, verification, developing organisational competence and/or associated tools in this area
	Performing configuration identification	e.g. Identifying Configuration Items (CIs); System elements and information items to be maintained under CM; Establishing unique CI identifiers; Establishing baselines for CIs at agreed points in the life cycle; Gaining agreement of baselines from acquirer/suppliers
	Performing configuration change management	e.g. Controlling life cycle baseline changes; Participating in Change Control Boards, Identifying, recording, reviewing, approving, tracking and processing requests for change and requests for variance (deviations)
	Performing configuration status accounting	e.g. Developing and maintaining configuration control documentation and CM data; Maintaining traceability of configurations, Communicating status of controlled items)
	Performing configuration evaluation	e.g. Performing configuration audits and CM surveillance reviews for milestones and decision gates to validate baselines, Participation in Functional and Physical Configuration Audits
	Performing release control	e.g. Performing prioritization, tracking, scheduling and closing of changes and documentation; Maintaining traceability
	Preparing for information management	e.g. Creating Information Management Strategy and associated IM Plan; Supporting establishment of data dictionary; Defining system-relevant information, storage requirements, access and duration for maintenance; Defining formats and media for transmission, retention, retrieval e.g. documents, database, web-based mechanisms; Identifying valid sources of information; Identifying responsibilities for origination, capture, archive, disposal (in accordance with. CM process), developing organisational competence and/or associated tools in this area
	Performing information management	e.g. Periodically obtaining/transforming artefacts; Maintaining information according to integrity, security and privacy requirements; Retrieving and distributing information in appropriate form as required; Archiving designated information complying with legal audit and knowledge retention requirements; Disposing of unwanted, invalid or unverifiable information, reflecting security and privacy requirements

A.11 Risk and Opportunity Management

Systems Engineering Area	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
Risk and Opportunity Management	**Planning (technical) risk management**	e.g. Defining and documenting Risk and Opportunity strategy and/or plans, developing organisational competence and/or associated tools in this area
	Managing the (technical) risk profile	e.g. Establishing and maintaining a risk profile to include: context, probability, consequence, risk thresholds, priority, actions and status of treatment; Defining and documenting risk thresholds, acceptable/unacceptable risk conditions; Periodically communicating with stakeholders
	Analyzing risks	e.g. Defining risk situations and identifying risks and opportunities; Analysing for likelihood, consequence and determine magnitude and priority; Defining a treatment scheme and resources for each risk including responsible person
	Treating risks	e.g. Using criteria, considering alternative treatments; Generating a plan of action when risk exceeds acceptable levels
	Monitoring risks	e.g. Maintaining a record of risks and treatments and tracking reduction and opportunity realisation; Maintaining transparent communication

A.12 Lifecycle Process Definition and Management

Systems Engineering Area	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
Lifecycle Process Definition and Management	**Establishing the Process**	e.g. Identifying sources of life cycle model information (e.g. enterprise, corporate, industry); Distilling information to create appropriate set of life cycle models for the organization; Establishing guidelines for life cycle model management (plans, policies etc.) and tailoring; Defining, integrating and communicating life cycle models and roles, responsibilities authorities and performance criteria; Using business achievements to establish entry and exit criteria for decision gates; Disseminating life cycle policies etc. throughout the organisation; Defining enterprise processes and best practices
	Assessing the Process	e.g. Using assessment and reviews of life cycle models to determine their adequacy; Identifying opportunities to improve; Using lessons learned as source of improvement
	Improving the Process	e.g. Using assessment and reviews of life cycle models to determine their adequacy; Identifying opportunities to improve; Using lessons learned as source of improvement, developing organisational competence and/or associated tools in this area

A.13 Specialty Engineering

Systems Engineering Areas	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
Specialty Engineering	**Performing professional-level Speciality Engineering activities**	e.g. Working in any of the following speciality engineering areas as defined in the INCOSE SE handbook (e.g. Affordability/Cost-Effectiveness/LCC Analysis; Electromagnetic Compatibility; Environmental / Impact Analysis; Interoperability Analysis; Logistics Engineering; Manufacturing and Produceability Engineering; Mass Properties Engineering; Reliability, Maintainability, Availability; Resilience Engineering; System Safety Engineering; System Security Engineering; Training Needs Analysis; Usability Analysis (Human Systems Integration); Value Engineering

A.14 Organizational Project Enabling Activities

Systems Engineering Area	Key SE Activities (as defined in the INCOSE SE Handbook V4.0)	Example Tasks (derived from the INCOSE SE Handbook)
Organisational Project Enabling Activities	**Establishing the Infrastructure**	e.g. Gathering and negotiating resource needs with organization and projects; Establishing the infrastructure resources and services to ensure organization goals and objectives are met; Managing resource and service conflicts and shortfalls with steps for resolution
	Maintaining the Infrastructure	e.g. Managing infrastructure resource availability to ensure organizational goals and objectives are met; Managing conflicts and shortfalls with steps for resolution; Allocating infrastructure resources and services to projects; Controlling multi-project infrastructure management communications to effectively allocate resources across the organization; Identifying potential future or existing conflict issues and problems with recommendations for resolution, developing organisational competence and/or associated tools in this area
	Identifying Skills	e.g. Identifying skills in a "skills inventory"; Reviewing current and anticipated projects to determine skills needed across the project portfolio; Evaluating skills needs against available people with the prerequisite skills to determine if training or hiring is required
	Developing Skills	e.g. Obtaining (or developing) and delivering training to close identified gaps of project personnel; Identifying assignments that lead towards career progression
	Acquiring and providing skills	e.g. Providing human resources to support all projects; Training or hiring qualified personnel when gaps indicate skill needs cannot be met with existing personnel); Maintaining communication across projects to manage resources effectively across the organization; Identifying current or potential future conflicts and make recommendations; Scheduling other assets as required; developing organisational competence and/or associated tools in this area
	Planning Quality Management	e.g. Identifying, assessing and prioritizing quality guidelines consistent with the organization strategic plan; Establishing QM guidelines – policies, standards and procedures; Establishing organization and project QM goals and objectives– policies, standards and procedures; Establishing organization and project QM responsibilities and authorities
	Assessing Quality Management	e.g. Evaluating project assessments; Assessing Customer satisfaction against compliance with requirements and objectives; Continually improving the QM guidelines
	Performing quality management corrective action and preventative action	e.g. Recommending appropriate action, when indicated; Maintaining open communications – within the organization and with stakeholders; developing organisational competence and/or associated tools in this area
	Planning Knowledge Management	e.g. establishing a strategy to capture "right" level of knowledge; Establishing scope of KM strategy - Helping projects to identify what to capture; Establishing which projects will be subject to this process
	Sharing Knowledge and skills throughout the organisation	e.g. Capturing, maintaining and sharing per the strategy; Establishing infrastructure mechanisms to identify and access assets
	Managing knowledge, skills and knowledge assets	e.g. As domain/product changes, ensuring assets are revised or replaced with latest information; Assessing and tracking where knowledge assets are used, applied or where they are applicable; Determining whether knowledge assets reflect advances in technology and evolve as necessary; developing organisational competence and/or associated tools in this area
	Defining and authorising SE projects	e.g. Identifying, assessing and prioritizing investment opportunities; Establishing business area plans (based upon strategic objectives); Establishing Project Scope and expected outcomes and SE/PM accountabilities and authorities; Establishing the domain area of product lines as defined by features and variability; Allocating adequate funding & resource; Identifying interfaces and opportunities for synergies across projects, developing organisational competence and/or associated tools in this area
	Evaluating the portfolio of SE projects	e.g. Evaluating ongoing projects to provide rationale for continuation, redirection or termination
	Terminating SE projects	e.g. Closing, cancelling or suspending SE projects that are complete or designated for termination

A.15 Other

Other functions and activities performed that you can justify as Systems Engineering activities.

A.16 Example

As an example for the CSEP level, figure A-1 graphically depicts some possible options for distributing the required five years of SE experience across various SE experience areas (designated A1, A2, A3, etc. in the figure). To illustrate the application of the guideline, consider the case of a candidate with 5 years of SE experience and a qualifying degree. Option 1 is an experience distribution for a candidate with considerable depth in one area and less breadth overall, such as 1 year in Requirements Engineering, 1 year in Systems Integration, and 3 years in Specialty Engineering. Alternately, Option 4 is applicable to a candidate with a wider breadth of experience and limited depth in any area, such as 1 year in Requirements Engineering, 1 year in Systems Integration, 1 year in Specialty Engineering, 1 year in Technical Planning, 0.5 years in Architecture / Design Development, and 0.5 years in Information and Configuration Management. The other options in Figure A-1 represent some other, but not all, possible combinations of acceptable experience distributions.

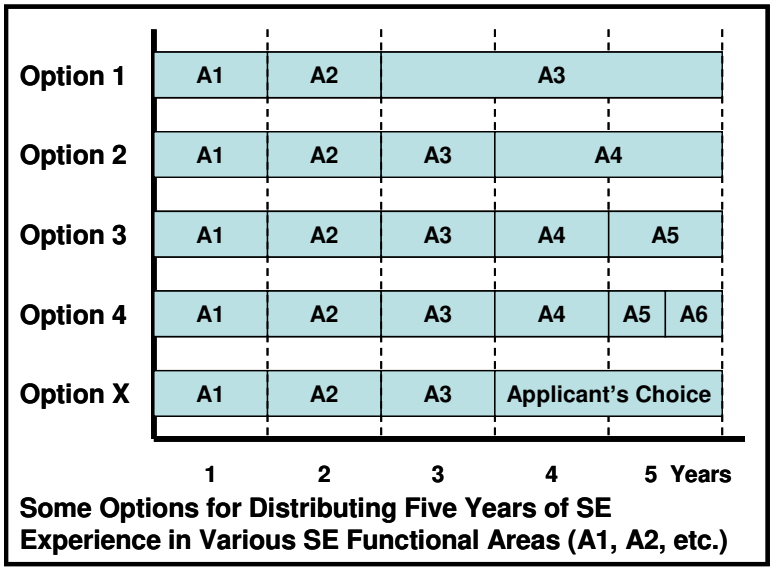

Figure A-1 Some Possible Distribution Options on SE Experience

Appendix B – Candidate References

A "Colleague" used as a reference, is an associate or fellow worker who is equal or at a higher position at work and can attest to your "systems engineering knowledge" and past experience in successfully performing "systems engineering tasks."

Part of the process in certifying a candidate as a Systems Engineering Professional is to obtain data from references that the candidate performed the tasks as described in the application. All of the following categories of people should qualify as credible references:

- Supervisors for whom you work and/or who provide your systems engineering performance rating
- Program Managers/Task Leaders for whom you work and/or who provide input for your systems engineering performance rating
- INCOSE Fellows who are acquainted with your work (experience), knowledge, leadership, and contributions to systems engineering
- INCOSE Leaders who are acquainted with your work (experience), knowledge, leadership, and contributions to systems engineering
- INCOSE Certified Systems Engineering Professionals who are acquainted with your work (experience), knowledge, leadership, and contributions to systems engineering.

Requirements for qualified references:

- INCOSE CSEPs, ESEPs, and Fellows are automatically qualified – but SEP is NOT mandatory,
- References do not necessarily need to be practicing systems engineers, but shall be knowledgeable of, or able to assess, systems engineering process or work-products,
- References must have a minimum of 10 years of relevant work experience, and
- References do not all need to be managers or supervisors.

A candidate should provide qualified references from a mixture of these categories. Thus, a candidate should limit references to two from any one category. References, who provide information to support a candidate and their reasons for the recommendation, should also submit information on their own work (experience), knowledge, leadership, and contributions to systems engineering. A reference's resume is usually too shallow in details to be effective at proving the reference is qualified; additional details are required.

Appendix C – Qualifying Professional Development AND Contribution to Systems Engineering Profession Activities for ESEP Candidates

The following are descriptions for qualifying professional development ***and*** contribution to systems engineering profession activities for ESEP candidates.

Product Development Leadership Years – Years of leadership in a product development position, such as chief engineer or development team lead – one year earned for each year in a leadership position – no total limit.

Technical Society Leadership Years – Leadership in a professional technical society as elected officer or appointed committee chair – one-half year earned for each year of service – no total limit.

Advanced Academics Years – Limited to a maximum of four (4) years from advanced degrees and graduate-level teaching:

- Master's degree, or equivalent, in a qualifying field – one (1) year
- Doctor of Philosophy degree, or equivalent, in a qualifying field – two (2) years if separate credit is given for a Master's degree; three (3) years if separate credit is not given for a Master's degree.
- Systems engineering graduate-level teaching – limited to a maximum of three (3) years. [One year of credit is earned for each five hundred (500) hours of classroom instruction spread over a three (3) year time period.]

Appendix D – Guidelines for ASEP and CSEP Recertification

For a Certified Systems Engineering Professional's (CSEP) certification to remain valid, it must be renewed every three years.[1] An Associate Systems Engineering Professional's (ASEP) certification must be renewed every five years. Expert Systems Engineering Professionals (ESEPs) do not have a renewal requirement. Extensions are renewed at the same time as the SEP renewal, regardless of when the extension was earned. The requirement for continuing professional competency is intended to reinforce the need for lifelong learning and development in order to stay current with changing technology, equipment, procedures, processes, and established standards. Each SEP is encouraged to select meaningful educational and development activities which will benefit them in the pursuit of their chosen areas. The definition of course/activity is: Any qualifying SE course or SE educational activity with a clear purpose and objective which will maintain, improve, or expand SE skills and knowledge relevant to the SEP's area of expertise.

To encourage a broad exposure to different learning and development opportunities, SEPs are not allowed multiple credit claims for repeated participation in the same student-based learning activity throughout the history of their certification, i.e. do not claim student participation in the same course more than one time. A similar rule applies to instructors and their presentation of a Systems Engineering related course, i.e., they will receive credit for preparation and presentation of a course only once. However, they may receive additional credit if a course is significantly updated.

The recertification activities described in this appendix are applicable to anyone certified or renewed after July 31, 2009.

RECERTIFICATION REQUIREMENTS

To maintain CSEP certification, a minimum of 120 Professional Development Units (PDUs) are required for every 3-year certification period. For an ASEP, the requirement is 120 PDUs every 5 years. One PDU is earned for each hour spent in any of the professional development activities listed in Table 1 in the three categories of Technical Society Participation, SE Course Work & Publication, and SE Job Function Participation. SEPs may pursue activities in one or more of the three categories in Table 1 to earn the minimum of 120 PDUs required for recertification every 3 years. There are limits noted on the maximum number of PDUs for which credit is allowed for some activities. While not required, it is desired that SEPs earn PDUs in multiple categories and activities.

[1] See the INCOSE Certification website to obtain the following certification renewal forms: Form 6 "Application for Renewal of INCOSE Systems Engineering Certification", Form 7 "Instructions for Renewing SE Certification", and Form 13 "Log of Continuing Education Credits".

Up to 30 excess PDUs earned during a renewal period can be carried over to the next certification period. All recertification requirements must be completed by the certification expiration date.

Table 1 List of Education and Development Activities for Certification Renewal and Number of Units Earnable

Technical Society Participation Category	**Units Earned**	**Maximum per renewal period**
Be an INCOSE individual, senior, or student member	5 PDU/year	15 PDU
Attend Professional Technical Society local event/chapter presentation/exhibit	1 PDU/hour attendance	30 PDU
Attend Professional Technical Society Conference/Symposium	1 PDU/hour attendance	72 PDU
Participate on Professional Technical Society working groups, committees, etc.	1 PDU/hour of effort	No limit
Perform Leadership Role in Professional Technical Society at local, national or international level	1 PDU/hour of effort	No limit
Volunteer activities with youth in schools or community related to science, technology, engineering, and math(STEM)	1 PDU/hour of effort	72 PDU
Volunteer activities with community, school, or non-profit organizations that help them accomplish their technical needs	1 PDU/hour of effort	30 PDU
Earn an SE-relevant, exam-based, professional certification other than INCOSE SEP	5 PDU/certification	10 PDU
SE Course Work & Publication Category	**Units Earned**	**Maximum per renewal period**
Complete a technical graduate level course	2 PDU/class hour	No limit
Attend educational course, tutorial, or seminar	1 PDU/hour	No limit
Teach professional development coursework, including presentations not part of job function.	2 PDU/hour (prep) 1 PDU/hour (teach)	40 PDU
Write & publish SE article	5 PDU/article	No limit
Write & publish SE book	30 PDU (primary author)/book 10 PDU (contributing author)/book	No limit
Attend vendor presentation with educational value	1 PDU/hour attendance	15 PDU

SE Job Function Participation Category	Units Earned	Maximum per renewal period
Receive Patent Award	10 PDU/award	No limit
Serve as designated lead systems engineer for a system, product or service	15 PDU/year	45 PDU
Lead organization to increase INCOSE systems engineering certifications	5 PDU/year	15 PDU
Volunteer (i.e., non-compensated) activities within your organization related to engineering and science	1 PDU/hour of effort	30 PDU

Technical Society Participation Category

A Professional Technical Society is one that is devoted to the improvement of a technical (engineering related) profession for the benefit of its members and society. A non-inclusive list of acceptable Professional Technical Societies includes such organizations as: INCOSE, AIAA (American Institute on Aeronautics and Astronautics), ASME (American Society of Mechanical Engineers), IEEE (Institute of Electrical and Electronic Engineers), SAE (Society of Automotive Engineers), NSPE (National Society of Professional Engineers), ASCE (American Society of Civil Engineers), and AIChE (American Institute of Chemical Engineers).

Activities in this category and the number of PDUs that may be earned are as follows:

- **Maintain INCOSE Membership** – A SEP may earn 5 PDUs per year by maintaining active (dues paying) individual membership status in INCOSE. Professional Society local event or Chapter Meeting
- **Attend Professional Technical Society local event/chapter presentation/exhibit** – A SEP may earn 1 PDU for each hour of attendance at local chapter meetings or events sponsored by a Professional Technical Society at which the main topic on the agenda is an engineering-related presentation/exhibit/discussion within the CSEP's area of practice. No credit is earned for attendance at business-only meetings. There is a limit of 30 PDUs that may be earned during a renewal period.
- **Attend Professional Technical Society Conference/Symposium** - A SEP may earn 1 PDU for each hour of attendance at sessions with System Engineering content at a conference/symposium sponsored by a Professional Technical Society. Typically, a Conference/Symposium will be at least six hours to multiple days in duration. There is a limit of 72 PDUs that may be earned during a renewal period.
- **Participate on Professional Technical Society working groups, committees, etc**. - A SEP may earn 1 PDU per hour for performing volunteer work on behalf of INCOSE or other Professional Technical Society by serving as a working group or committee member, item writing contributor, paper reviewer or other type of approved volunteer activity. There is no limit on the number of PDUs that may be earned on these activities.
- **Perform Leadership Role in Professional Technical Society at local, national or international level** - A SEP may earn 1 PDU per hour for performing volunteer work on behalf of INCOSE or other Professional Technical Society by serving in an elected or

appointed leadership role. Credit may be earned for time spent in leadership related tasks devoted to planning, leading, and reporting on activities. There is no limit on the number of PDUs that may be earned on these activities.

- **Volunteer activities with youth in schools or community related to science, technology, engineering, and math (STEM) -** A SEP may earn 1 PDU per hour for performing volunteer work work with youth (generally under age 24) in a school or community activity related to science, technology, engineering, or math (STEM). Credit may be earned for time spent in teaching / demonstrating or in tasks devoted to planning, leading, and reporting on activities. There is a limit of 72 PDUs that may be earned during a renewal period.
- **Volunteer activities with community, school, or non-profit organizations that help them accomplish their technical needs -** A SEP may earn 1 PDU per hour for performing volunteer work to assist a community, school, or other non-profit organization accomplish their technical needs. Credit may be earned for time spent developing or improving technical processes, assessing requirements, or other areas for which the services of a systems engineer are valuable beyond purely administrative support. There is a limit of 30 PDUs that may be earned during a renewal period.
- **Earn an SE-relevant, exam-based, professional certification other than INCOSE SEP** – A SEP may earn 5 PDUs for each additional professional certification awarded. There is no limit on the number of PDUs that may be earned on this activity.

SE Course Work & Publications Category

Activities in this category are directed toward enhancing the technical and developmental skills of the CSEP and toward encouraging the CSEP to share his or her knowledge and experience with others in the systems engineering profession.

Activities in this category and the number of PDUs that may be earned are as follows:

- **Complete a graduate-level technical course -** A SEP may earn 2 PDUs for each hour spent in class of a graduate-level technical course that is related to the CSEP's current or projected future area of practice. Credit will only be given on successfully completing the course. As an example, a semester length course that meets for 1 hour per week over 15 weeks would earn 30 PDUs. There is no limit on the number of PDUs that may be earned on these activities.
- **Attend an educational course, tutorial, or seminar -** A SEP may earn 1 PDU for each hour of attendance at a training course, tutorial, or educational seminar that is related to the SEP's current or projected future area of practice. Credit will only be given on passing the activity successfully as documented by a certificate of completion signed by the educational provider. There is no limit on the number of PDUs that may be earned on these activities.
- **Teach professional development coursework, including presentations not part of job function** - A SEP may earn PDU credits for the **initial** and **revised** preparation of courseware, lectures, or training materials. The time spent preparing materials for each hour of presentation is valued at 2 PDUs (i.e. a one hour presentation earns 2 PDUs of credit for the preparation work, a two hour presentation earns 4 PDUs, etc). Under this

activity, a SEP is also given credit for time spent presenting the course, lecture, or training for the first two times at the rate of 1 PDU per hour of presentation time. The maximum combined number of PDUs on these activities is limited to 40 in any renewal period.

- **Write & publish SE article** - A SEP may earn 5 PDUs for contributing original work to the System Engineering professional body of knowledge by writing and getting an SE - related article published. Credit is given for only the first publication of the article. There is no limit on the number of articles that can be written and published in a renewal period and the number of PDUs that can be earned on these activities.
- **Write & publish SE book** – A SEP may earn PDUs for writing and getting a book on Systems Engineering published. The primary author or editor will earn 30 PDUs per book; one CSEP cannot earn credit as both author and editor on the same book. Each contributing author will earn 10 PDUs per book. There is no limit on the number of books that can be written and published in a renewal period and the number of PDUs that can be earned on these activities.
- **Attend vendor presentation with educational value -** A SEP may earn 1 PDU for each hour of attendance at a vendor meeting or presentation if the presentation has an educational aspect with regard to system engineering methodology, technology, or practice. "Pure sales presentations" do not qualify. There is a limit of 15 PDUs per renewal period.

All activities for which PDU credits are claimed must be relevant to the practice of systems engineering and may include technical, ethical, or managerial content. These activities should advance the professional or technical competence of the SEP. PDUs are earned for activities that exceed normal on-the-job experience. The activities described are not all inclusive, as many other events and activities, such as graduate study in a related academic field, may also qualify. It is each SEP's responsibility to assure that the activities in which he/she participates meet these requirements.

The American Society of Engineering Education (ASEE), a nonprofit organization committed to continuing engineering education, has an online resource that may help locate continuing education courses across many engineering disciplines. This online resource has links to online courses, video courses, evening courses, or weekend courses offered by U.S. engineering schools and professional societies. The following types of courses and activities **do not qualify** for PDUs: personal estate and financial planning; courses in self-study or personal self-improvement; service club meetings or activities; equipment demonstrations or trade shows; topics not relevant to engineering; enrollment without attendance in courses or seminars, etc.; repetitive teaching of the same course without updating the course material; and conversational language courses for personal use.

SE Job Function Participation Category

All SEPs applying for recertification are generally expected to have been performing systems engineering tasks during their prior three years (five years, for ASEPs) and may have benefited from their on-the-job experience. However, because of the diversity of assignments and the difficulty in quantifying the amount of on-the-job learning, the following every day work-related

activities **do not qualify** for PDU credit: regular employment, preparing internal organizational presentations as part of the CSEP's work duties, writing for internal organizational publications, providing internal organizational consulting, and compensated work completed by consultants for clients, etc.

There are three job-related systems engineering activities which are unique learning experiences that are readily quantified. These three activities and the PDUs granted for them are as follows:

- **Receive Patent Award** – A SEP may earn 10 PDUs for each patent awarded. There is no limit on the number of PDUs that may be earned on this activity.
- **Serve as designated lead systems engineer for a system, product or service** - A SEP may earn PDUs for each full year served as a designated lead system engineer for the development, production, and/or support of one or more major systems, products, or services. There is a limit of 45 PDUs in a renewal period.
- **Lead organization to increase INCOSE systems engineering certifications** - A SEP may earn PDUs for each full year served in helping his or her organization administer an internal effort to increase INCOSE systems engineering certifications. This activity is restricted to CSEPs in those organizations that have a Memorandums of Agreement with INCOSE to promote INCOSE SE certification. There is a limit of 15 PDUs in a renewal period.

Volunteer (i.e., non-compensated) activities within your organization related to engineering and science - A SEP may earn PDUs for volunteer activities (beyond those required for a job) related to engineering and science. This cannot include work on a proposal. There is a limit of 30 PDUs in a renewal period.

Submission of PDU Credits

The ASEP or CSEP is responsible to submit the credits earned and to ensure the veracity and accuracy of his/her recertification records.

Record keeping - Documentation

Each ASEP or CSEP should maintain a summary log that lists his/her PDU activities. The log should contain the ASEP's or CSEP's certification number, activity, dates performed, source of activity, description of activity, location, and PDU value. A template for the log is provided on the INCOSE Certification website.

It is important that sufficient objective evidence be retained to identify that the activity relates to systems engineering, including the presenter's name. Evidence may be in the form of completion certificates, course completion records, receipts for attendance or other registration materials, or official event minutes including attendee names or roster. The name of the sponsoring organization must be provided as well as the location of where the instruction, session, or class was held. For classes that are part of a college curriculum, please list the class or course number.

The log of continuing credit earned is to be submitted with the SEP's renewal form and fee. Material, such as detailed course descriptions and certificates of completion, may be requested to check the quality of the courses/activities on the log of continuing education.

The Certification Program Office will audit a randomly selected portion of all renewals to ensure the quality of courses/activities and compliance with the renewal requirements. When random audits are done, they will be completed as part of the renewal reviews. All records of attendance and completion of PDU credits should be maintained for a minimum of 12 months after the cycle they have been earned in or applied to, whichever is later.

Credits Disallowed Upon Audit

Certification will be renewed if the SEP has met the minimum requirements for PDU units. If the SEP's supporting documentation is audited and the INCOSE Certification Office determines that some credits are unacceptable, the SEP will have 180 days to obtain sufficient PDU units that are acceptable, provided the renewal fees have been paid on time. If after 180 days the SEP has not obtained the requisite PDUs, the certificate will be revoked.

RECERTIFICATION RENEWAL FEES

A renewal fee (discounted for INCOSE members) is required for each certification renewal period. Renewal fees are due prior to the start of the renewal period and are payable in U.S. dollars. All SEP renewal fees are due in advance. For example, if a CSEP's certification 3 year cycle ends February 3, 2009, the appropriate renewal fee will cover the next 3 year certification cycle starting on February 4, 2009.

HARDSHIP EXCEPTIONS

Deferments from the continuing education requirements for hardship reasons, such as extended periods of illness, must be submitted in writing to the Certification Operations Manager. If a SEP applies for a hardship deferment, supporting documentation must show the extent the SEP has satisfied the recertification requirements, specify the time period for completing the requirement, and must be included as part of the material supporting the SEP's signed affidavit requesting a deferment.