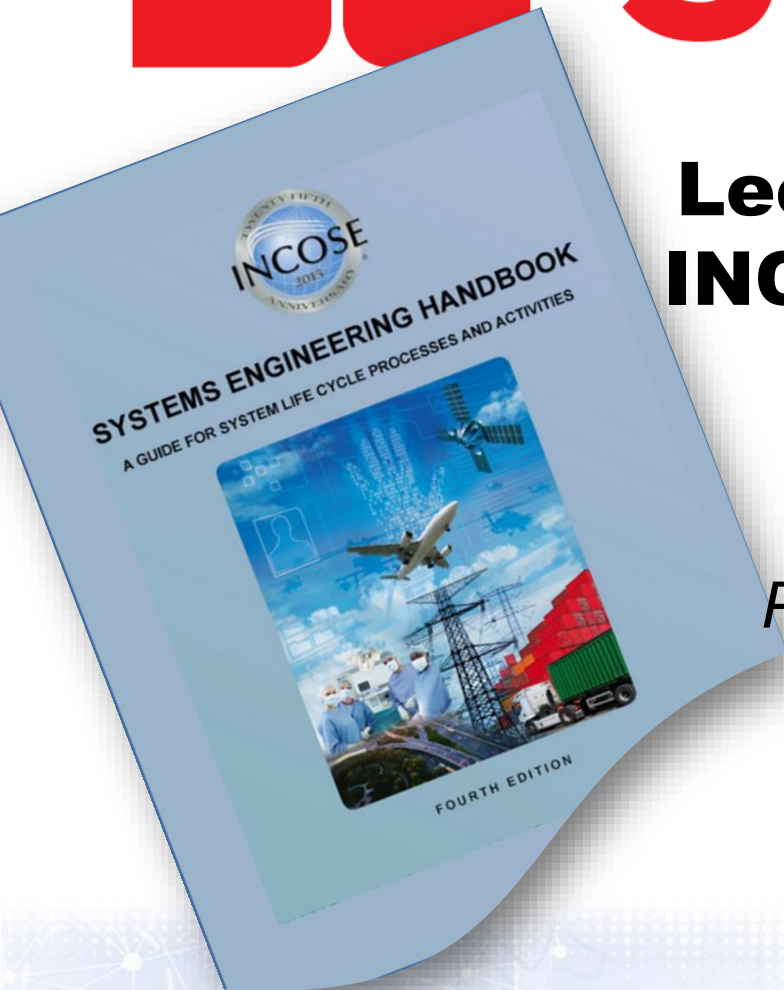




# SCHOLAR

## Lecture 1: Understanding the INCOSE Certification Process



*Tutorial on the  
INCOSE SE Handbook V4.0 in  
Preparation for SEP Certification Exam*



# Webinar Agenda

- Why Systems Engineering?
- What is INCOSE?
- What is the INCOSE SEP Certification?
- Review the INCOSE SEP Certification Application Process
- Review the Key Requirements of Certification
  - Education
  - Experience
  - Knowledge
  - Application
  - Exam



# Your Instructor



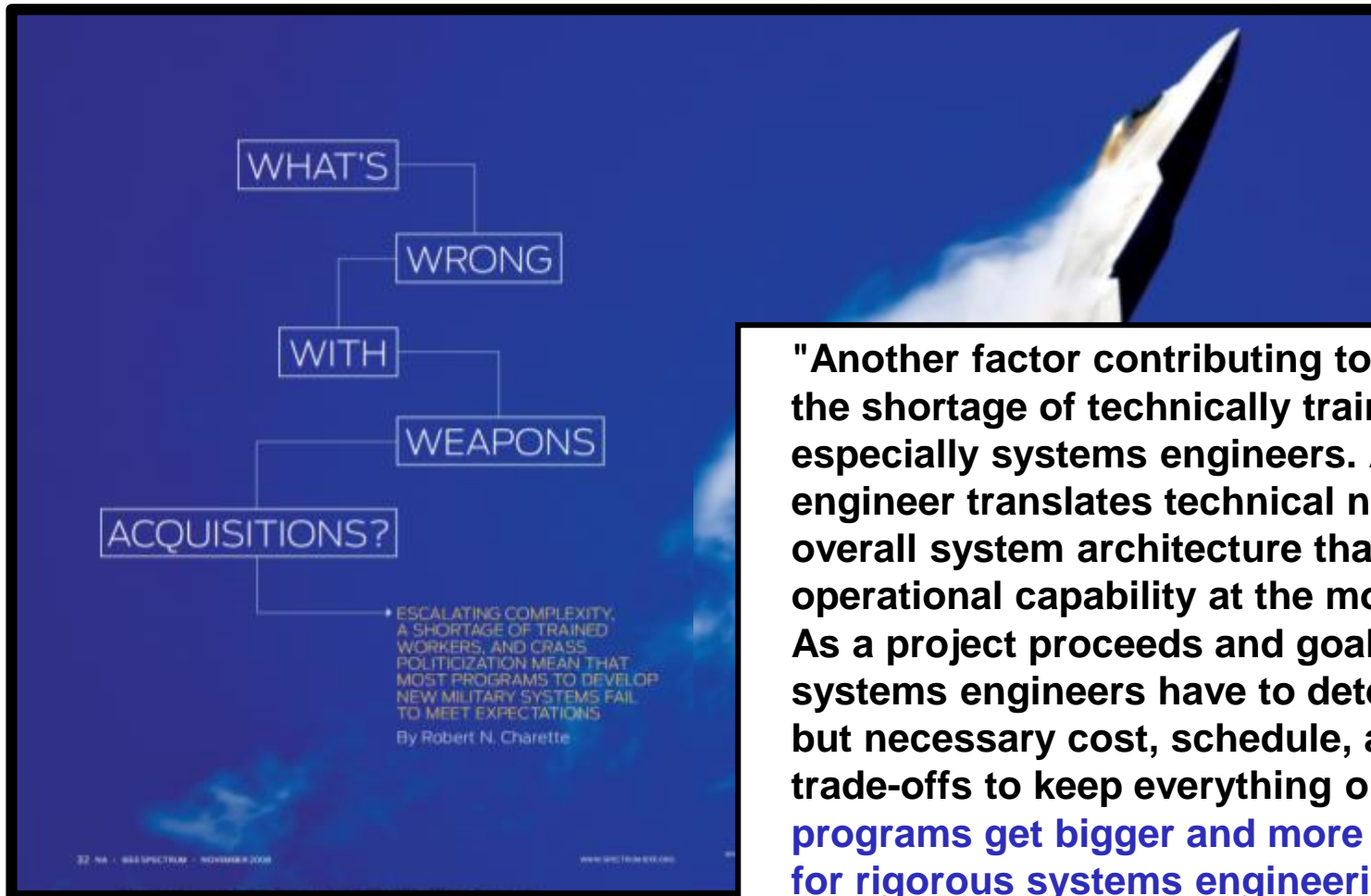
## Paul Martin, *ESEP, CTT+*

- Working as an Engineer since late '70's
  - GE → NAVSEA → NIMA → Army → DoD
  - UMBC Adjunct Professor
  - Involved with local INCOSE Chapter (Chesapeake)
    - **I've been teaching the INCOSE SEP Exam Prep Course since 2009**
- But enough about me, what about you?
    - Using the Chat function. Tell us:
      - Where do you live
      - Are you going after the ASEP/CSEP or ESEP?
      - Are you new to INCOSE?

# SE SCHOLAR

## The INCOSE Certification Process

# The need for Systems Engineers



**"Another factor contributing to program failure is the shortage of technically trained people, especially systems engineers. A systems engineer translates technical needs into an overall system architecture that creates the best operational capability at the most affordable cost. As a project proceeds and goals or needs shift, systems engineers have to determine the difficult but necessary cost, schedule, and performance trade-offs to keep everything on track. As programs get bigger and more complex, the need for rigorous systems engineering increases."**

**IEEE Spectrum, Volume 45, Issue 11, November 2008 Page(s):33 - 39**

# SEs are Problem-solvers

Across an organization's products or services, systems engineers also provide critical leadership for integrating the technical activities. They have skills to influence multidisciplinary teams to reach consensus on how the system solution should come together. As problem-solvers, they focus on outcome, not process.

*~ John Thomas, INCOSE President*

*Why Systems Engineers are Essential to Your Organization*



# What is INCOSE?

- The International Council on Systems Engineering (INCOSE) is a not-for-profit membership organization founded in 1990 to develop and disseminate the interdisciplinary principles and practices that enable the realization of successful systems.
- **MISSION:** Share, promote and advance the best of systems engineering from across the globe for the benefit of humanity and the planet.
- **VISION:** The world's authority on Systems Engineering.

# INCOSE Products

- Annual INCOSE International Symposium
- Journal of Systems Engineering
- INSIGHT Magazine
- Systems Engineering Body of Knowledge (SEBoK)
- OMG Systems Modeling Language (OMG SysML™)
- INCOSE Systems Engineering Handbook





# INCOSE Certification Program



**INCOSE has established a multi-level Professional SEP Certification Program to provide a formal method for recognizing the knowledge and experience of systems engineers, regardless of where they may be in their career.**

The INCOSE certification program has been developed as the highest quality, independent assessment of system engineering professionals.

***Purpose and Design (benefits)***

- **Systems engineering community:**
  - Creates the standard to identify and develop systems engineering professionals .
  - Establishes a formal, recognized body of knowledge for the systems engineering community.
- **System engineering professionals:**
  - Provides a portable standard of recognition for attainment of knowledge, education, and experience.
  - Its recertification requirements serve as a mechanism for continued professional development.
- **Organizations/institutions:**
  - A universal, industry-approved measure of a professional's knowledge – achieved through the independent evaluation of relevant tasks, projects, and programs.

**Certifications have been offered by INCOSE since 2004**

# What Is Certification?

- **It's NOT a Certificate:** a document attesting to the fact that a person has completed an educational course
- **It's NOT a License:** formal permission by the State to carry on some business or profession.
- **Certification is:**
  - Confirmation of an individual's competency (demonstrated education, experience, and knowledge) in a specified profession or occupational specialty
  - A formal process Issued by an organization
  - Voluntary
    - It is neither a barrier nor a gate to entering a job
    - However, it may be used as a qualifier in placement

# Professional Societies and Certifications



- Project Management Institute
  - **PMP** Project Management Professional
  - **PgMP** Program Management Professional
  - **CAPM** Certified Associate in Project Management
  - **ACP** Agile Certified Practitioner



- International Information Systems Security Certification Consortium
  - **CISSP** Certified Information Systems Security Professional



- IEEE Computer Society
  - **CSDP** Certified Software Development Professional

# INCOSE Multi-Level Certification

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

**Multi-Level Base Credentials - For every stage of your career**



# Why is Certification Important?

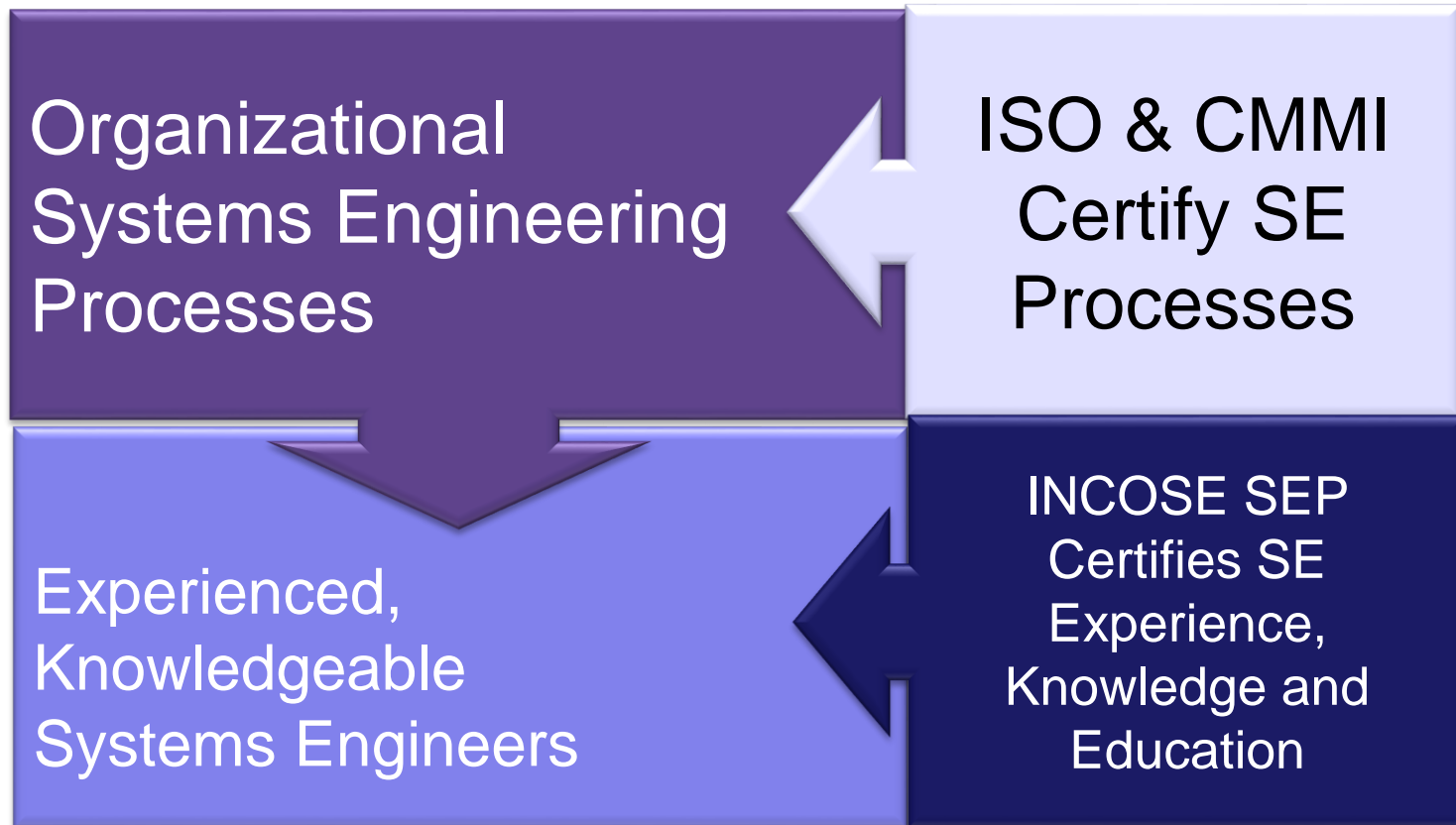
## For organizations...

- Formally recognizes the Systems Engineering capabilities of an organization's professional staff
- Can be a discriminator a discriminator for an organization's proposals
- Can be used as part of the hiring and promotion process
- Provides an independent internal and external assessment
- Encourages employee participation in continuing education

**INCOSE Certification sets an organization apart!**



# Successful Systems Engineering



**INCOSE Certification focuses on the company's people. It complements an organizational initiatives.**

# Certification Change in Focus

**From Organization to People**

**Organization ABC...**

**ISO 9000  
ISO 15504  
CMMI  
etc.**

**Individual First\_Last ...**

**ASEP, CSEP, ESEP  
CSDP  
CAPM, PMP, PgMP  
CSSIP  
etc.**

**Certification focuses on the company's people.  
It complements an organizational initiatives.**



# Why is Certification Important?



## For individuals...

- Formally recognizes your Systems Engineering capabilities
- Provides a discriminator for job applicants
- Provides a competitive advantage in your career
- Provides a portable Systems Engineering designation that is recognized across industry domains.
- Participation in continuing education indicates your commitment to personal development

**INCOSE Certification sets you apart!**

# Why is Certification Important?



## For your teams...

- Allows the team to level-set on Systems Engineering concepts and activities
- Helps establish a common Systems Engineering language for your team
- This can help break down ...
  - geographic boundaries
  - organizational boundaries
  - cultural boundaries

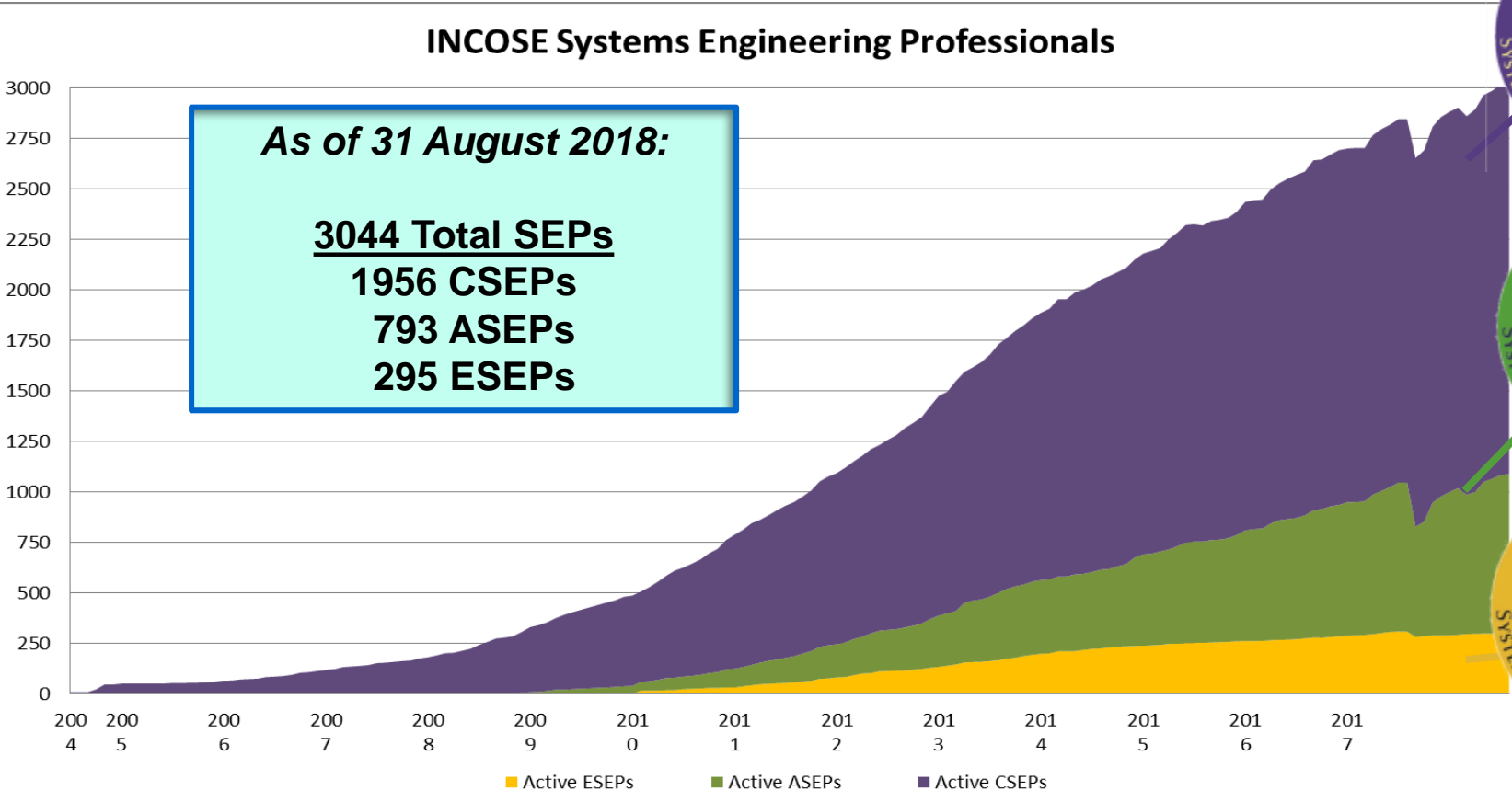
**INCOSE Certification is particularly useful for multi-organization, geographically distributed teams.**

# Ways to Leverage Certification



- Individuals
  - Recognition
    - Designation on business card, resume, signature, etc
  - Performance objective
- Organizations
  - Performance expectation
  - Career ladder alignment
  - Job advertisement
  - Proposal discriminator
  - Supplier qualification

# Certification by the numbers



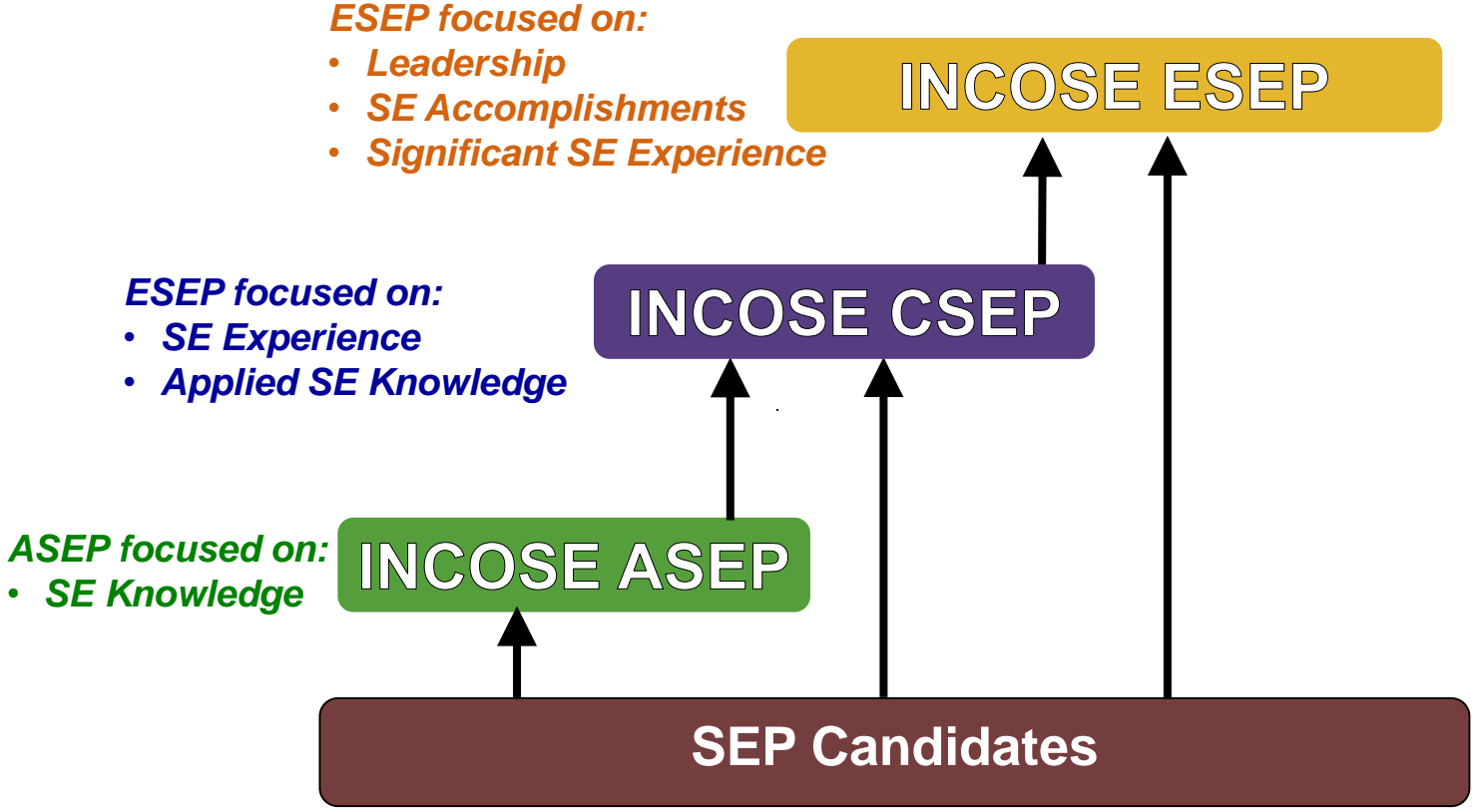
**The INCOSE certification program has experienced impressive growth and increased recognition since its introduction in 2004**

# Organizations with streamlined Certification processes

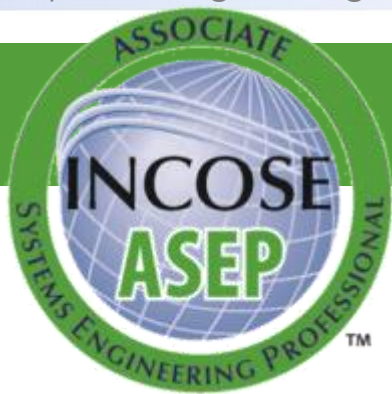


- Airbus Group
- Drexel University
- SAIC
- Roche Diagnostics
- ASTER TE
- AVIC IT
- Booz Allen Hamilton
- École Polytechnique
- Engility
- ISAE
- Jacobs
- LinQuest
- Lockheed Martin
- ManTech
- MITRE
- OPS Consulting
- Raytheon
- Stevens
- Thales
- University of New South Wales
- UTEP
- Perspecta
- WPI

# The SEP Aligns with the Typical Levels of a Systems Engineering Career



**You can enter at whatever SEP level is appropriate and can seamlessly transition between levels when ready.**

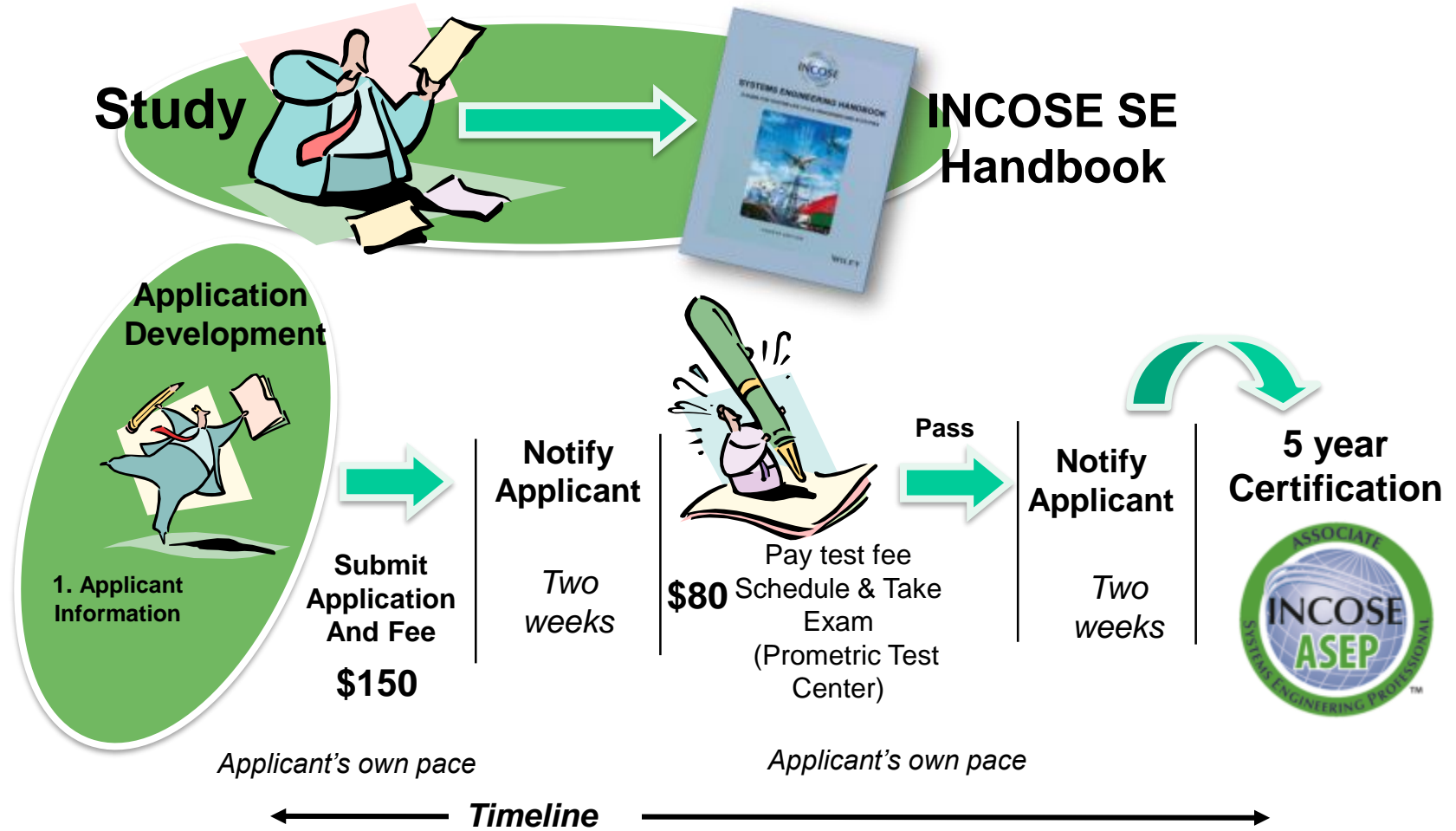


## Entry Level

# Associate Systems Engineering Professional

- Targeted towards junior/maturing Systems Engineers and recent college graduates with limited Systems Engineering work experience
- ASEPs are certified against knowledge requirements through an exam based on the INCOSE SE Handbook
- ASEPs must be, and remain, INCOSE members (\$145/year)
- Renewal every 5 years through on-going professional development, maximum duration of 15 years
- Available since 2008

# ASEP Certification Process



Applicant has up to one year to pass the test. Test is scheduled directly with Prometric.



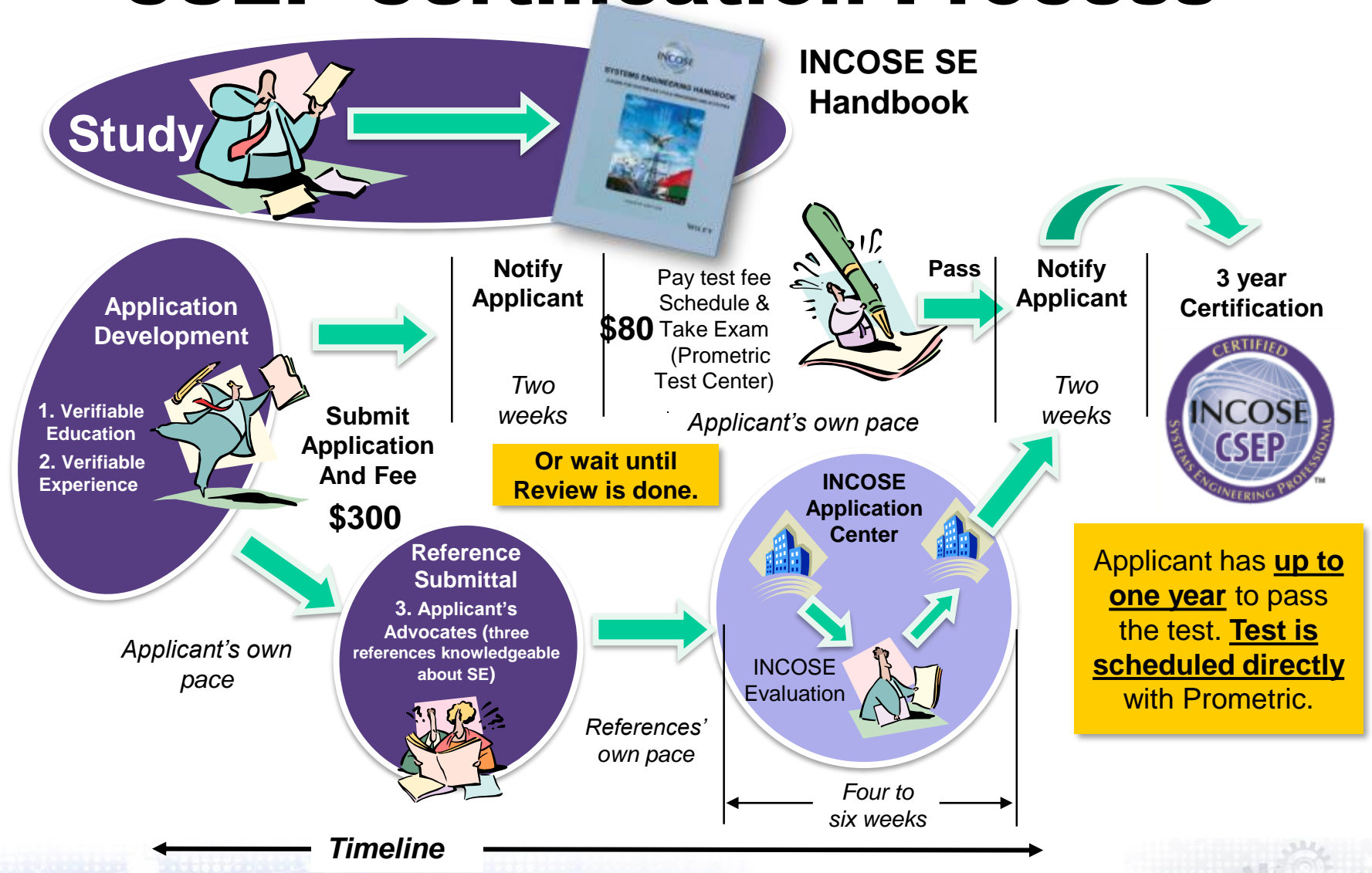


## Foundation Level

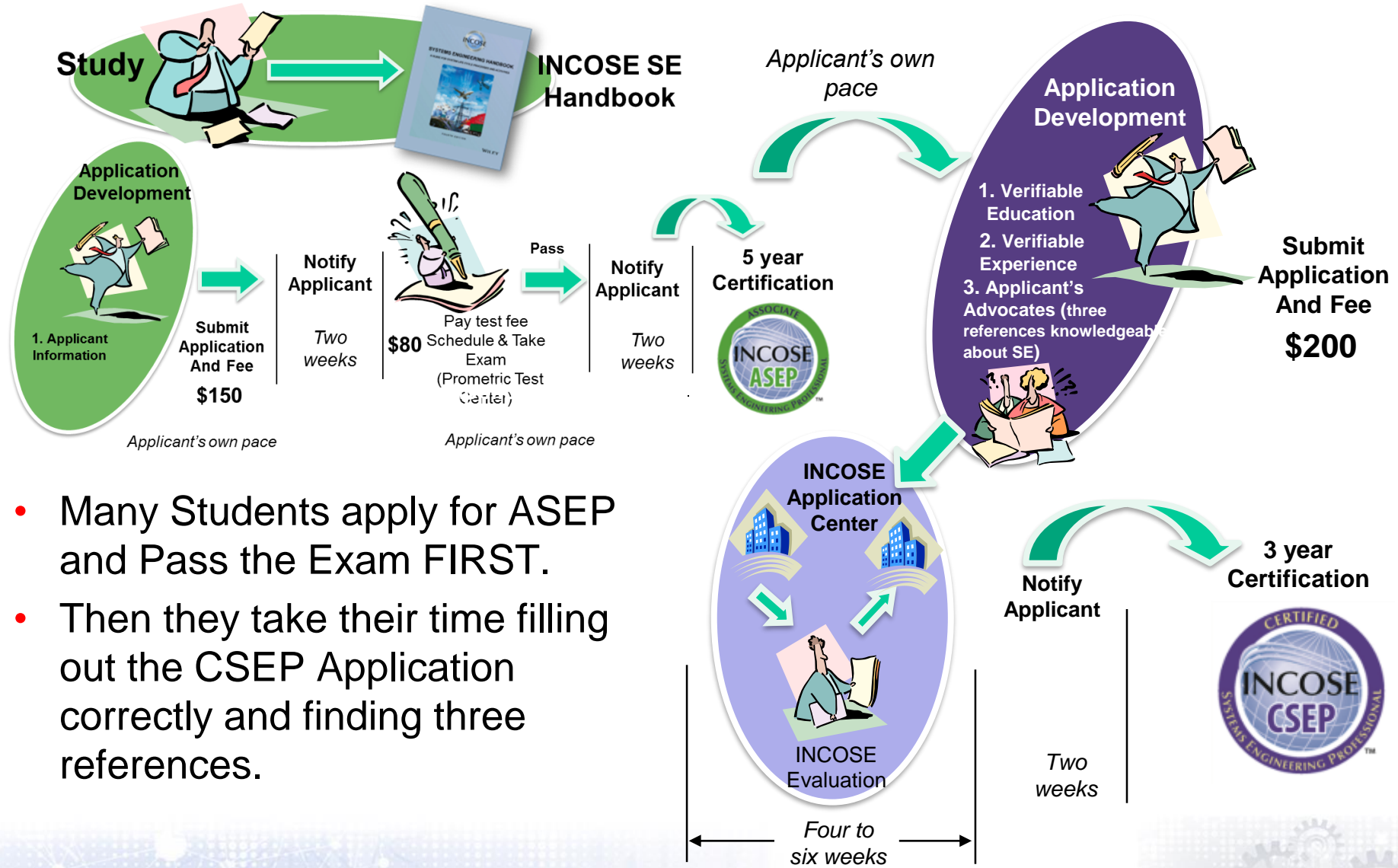
# Certified Systems Engineering Professional

- Targeted towards Systems Engineers with five or more years of Systems Engineering work experience
- CSEPs are certified against substantiated experience, education, and knowledge requirements
- Experience must be substantiated by 3-5 work-related references
- Knowledge certified through an exam based on the INCOSE SE Handbook
- INCOSE membership is required (\$145/Year)
- Renewal every 3 years through ongoing professional development
- Available since 2004

# CSEP Certification Process



# ASEP to CSEP Certification Process



- Many Students apply for ASEP and Pass the Exam FIRST.
- Then they take their time filling out the CSEP Application correctly and finding three references.

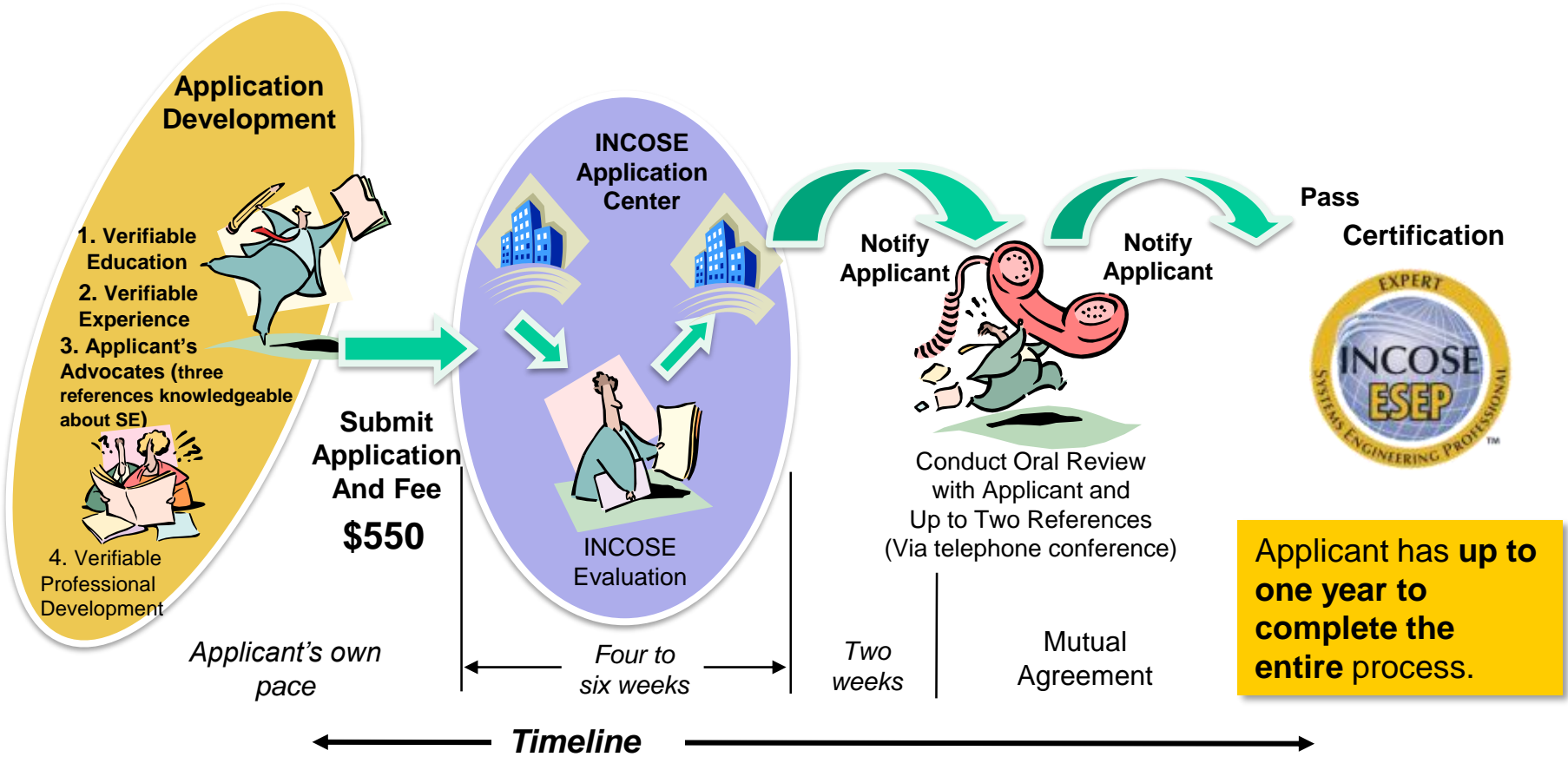


## Senior Level

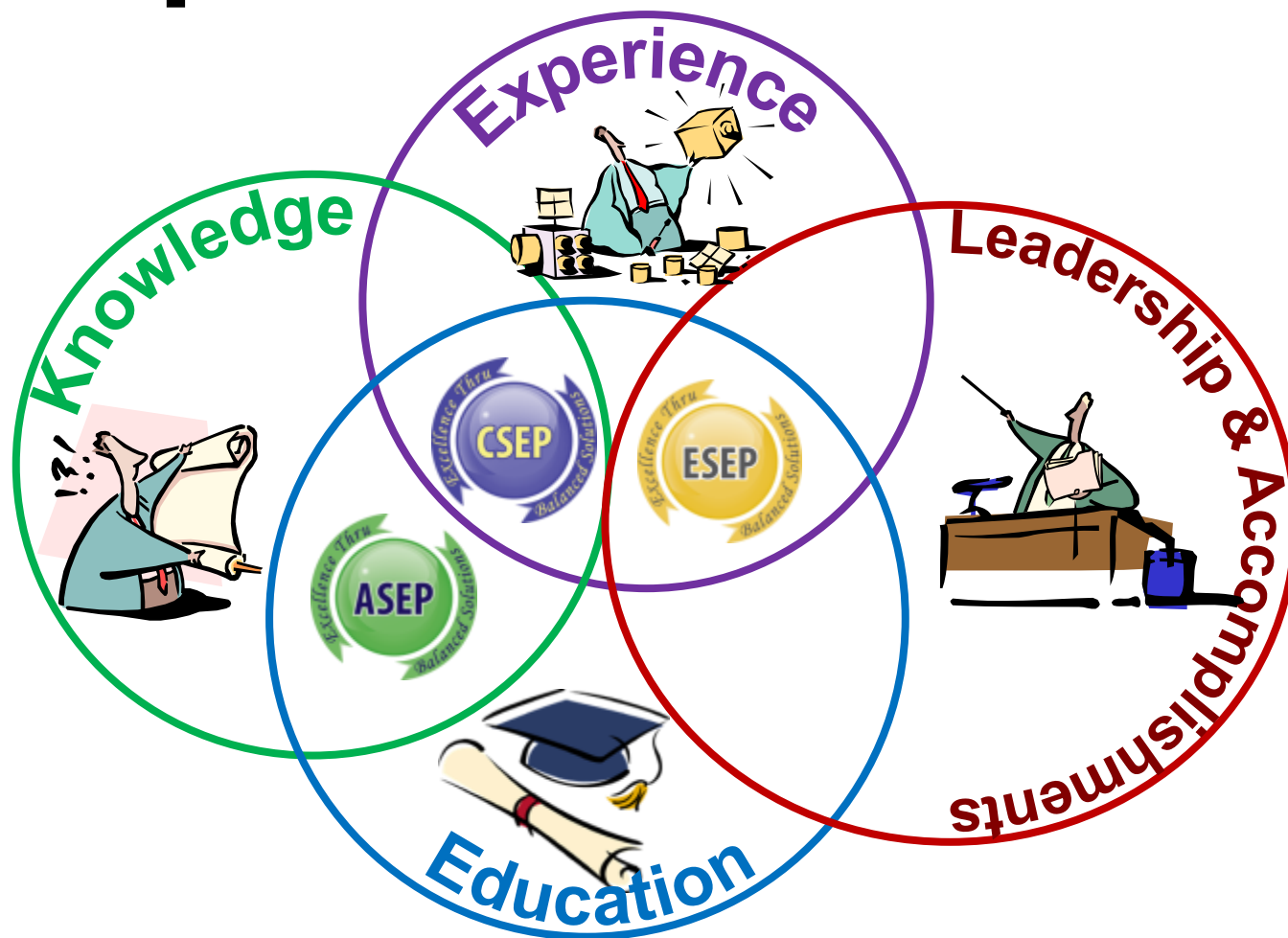
# Expert Systems Engineering Professional

- Targeted towards senior Systems Engineering leaders with recognized systems accomplishments, who have many years of Systems Engineering work experience
- ESEPs are certified against substantiated professional leadership, systems engineering accomplishments, experience, and education requirements
- At least 10 years of experience must be substantiated by 3-5 work-related references
- Interviews used to validate leadership and significant systems accomplishments
- ESEPs must be, and remain, INCOSE members
- No renewal requirements other than INCOSE membership
- Available since 2010

# ESEP Certification Process

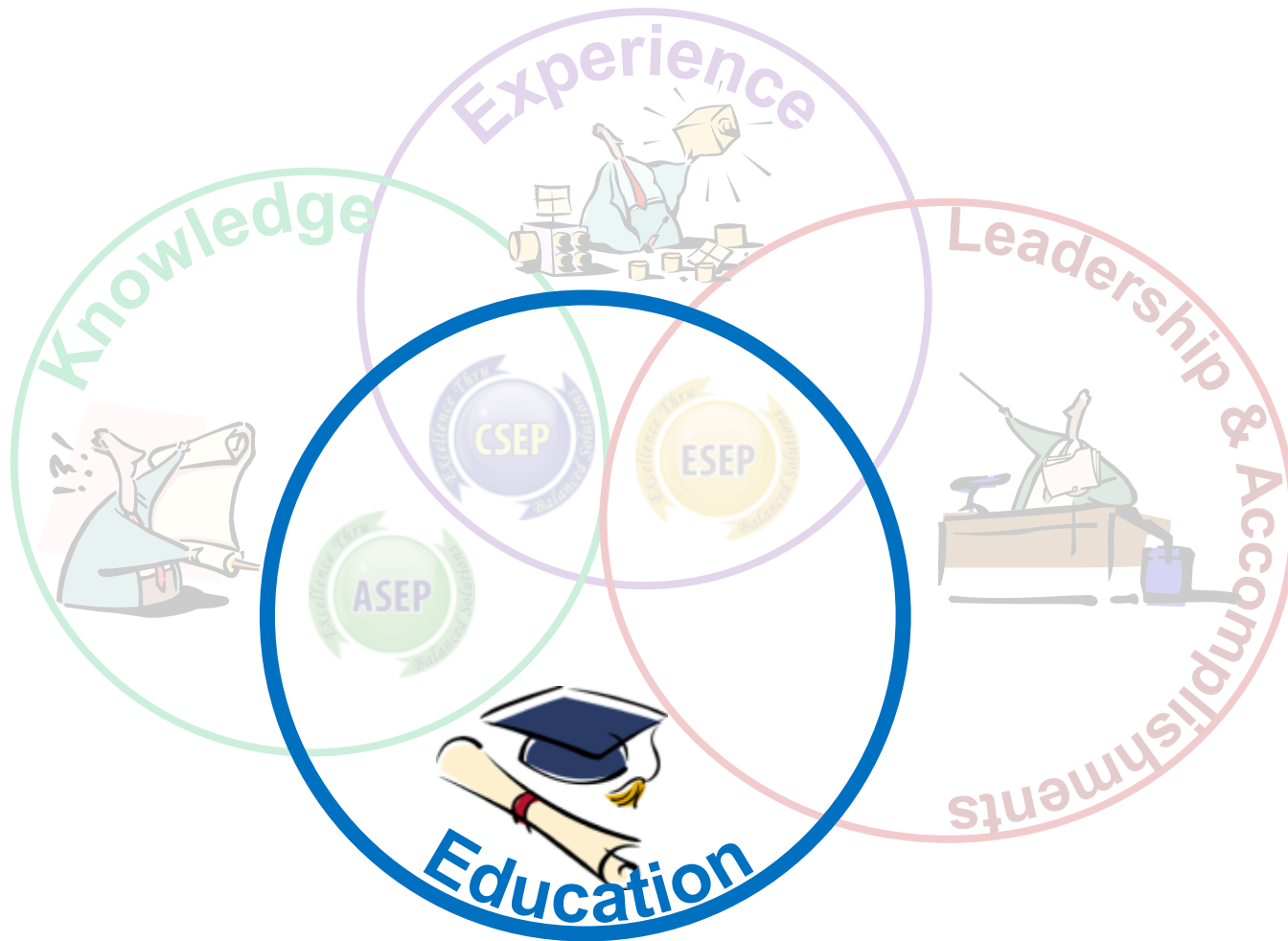


# Key Requirements of Certification



**These elements of the INCOSE certifications are measurable tangible parameters consistent with ISO guidelines for a certification program.**

# Certification Education Requirements



**These elements of the INCOSE certifications are measurable tangible parameters consistent with ISO guidelines for a certification program.**



# Certification Education Requirements

- Technical Bachelor's Degree (or international equivalent)
  - Acceptable engineering fields of study include: aeronautics, biomedical, chemical, civil, computer, electrical, environmental, mechanical, nuclear, software, systems
  - Acceptable other fields of study include: chemistry, computer science, mathematics, physics
  - If the Bachelor's degree does not come from the above fields, then a Masters or Doctorate degree (or international equivalent) in those fields is acceptable
  - INCOSE is the final authority on degree applicability

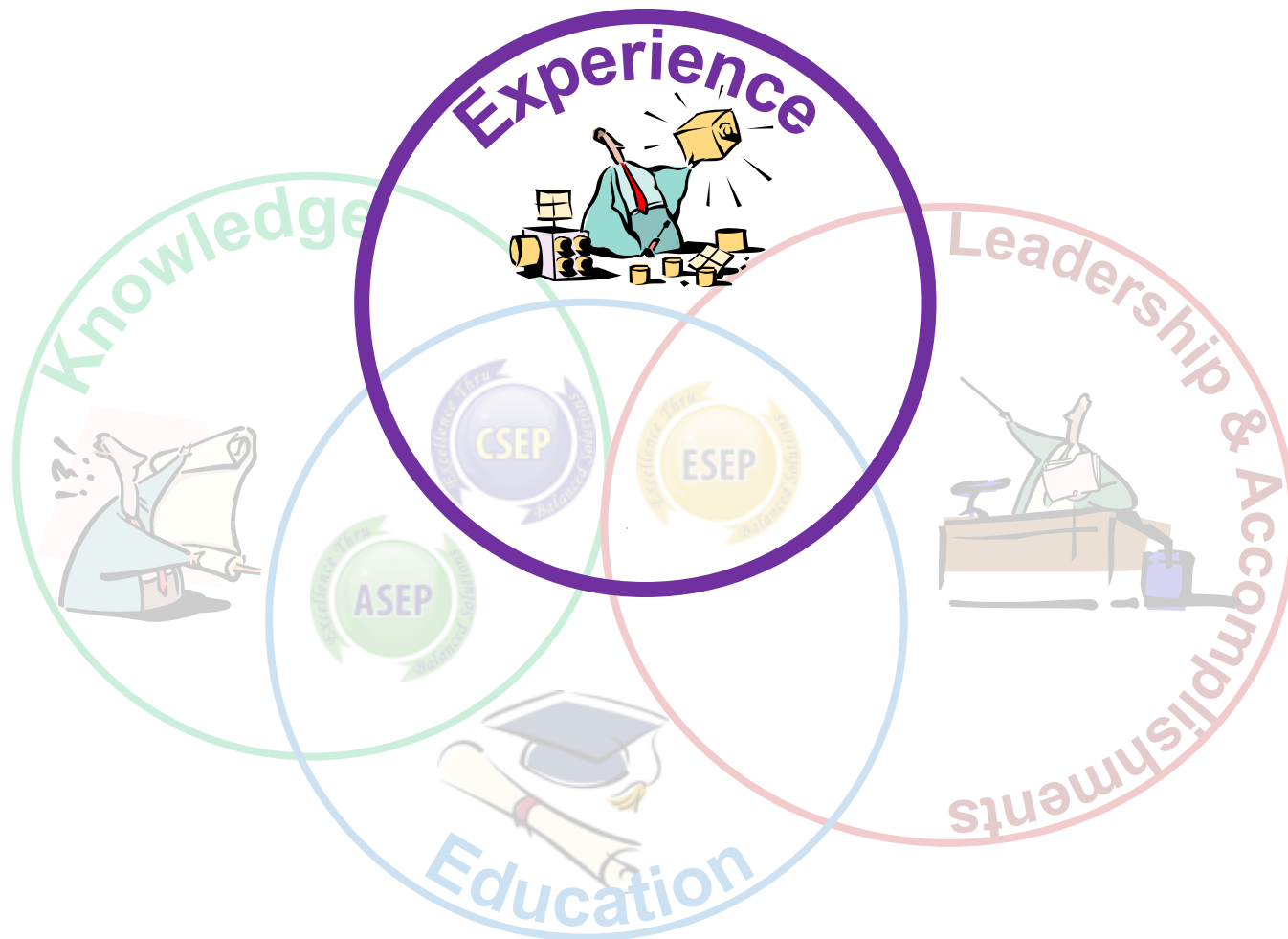




# Additional Experience Can be Substituted

- Minimum of 5 additional years of general engineering experience for non-technical Bachelor's degree
  - Minimum of 10 years (with at least 5 in SE) for CSEP
  - Minimum of 25 years (with at least 20 in SE) for ESEP w/ CSEP
  - Minimum of 30 years (with at least 25 in SE) for ESEP w/o CSEP
- Minimum of 10 additional years of general engineering experience if no Bachelor's degree
  - Minimum of 15 years (with at least 5 in SE) for CSEP
  - Minimum of 30 years (with at least 20 in SE) for ESEP w/ CSEP
  - Minimum of 35 years (with at least 25 in SE) for ESEP w/o CSEP

# Certification Experience Requirements



**These elements of the INCOSE certifications are measurable tangible parameters consistent with ISO guidelines for a certification program.**



# 14 Functional Areas Recognized for Systems Engineering Experience

- **SE Technical Competencies**
  - Requirements Engineering
  - System and Decision Analysis
  - Architecture/ Design Development
  - Systems Integration
  - Verification and Validation
  - System Operation and Maintenance
- **SE Management Competencies**
  - Technical Planning
  - Technical Monitoring and Control
  - Acquisition and Supply
  - Information and CM
  - Risk and Opportunity Management
- **SE Support Competencies**
  - Lifecycle Process Definition and Management
  - Specialty Engineering
  - Organizational Project Enabling Activities
- **Plus “Other”**
  - To allow for the variety of SE across domains
  - Applicants should describe what they are claiming as other experience

**Successful candidates must have balanced experience across multiple areas**



# SE Disciplines/Functional Areas Qualifying for SE Experience (1 of 2)

## Attachment A - Experience Applicable for Certification

- **Requirements Engineering:** Preparing for or managing a Business or Mission analysis; Defining a Problem or opportunity space; Characterizing a solution space; Evaluating alternative solution classes; Preparing for Stakeholder Needs & Requirements Definition; Defining stakeholder needs; Developing Operational Concept and other Life Cycle concepts; Transforming needs into stakeholder requirements; Analyzing Stakeholder Requirements; Managing Stakeholder needs and requirements definition; Preparing for System Requirements Definition; Defining System Requirements; Analyzing System Requirements; Managing System Requirements.
- **System and Decision Analysis:** Preparing, performing and managing a system analysis; Decision Management, including Preparing for System Engineering Decisions; Analyzing decision information; Making and managing SE decisions.
- **Architecture/ Design Development:** Preparing for architecture definition; Developing architecture viewpoints; Developing models and views of candidate architectures; Relating architecture to design; Assessing candidate architectures; Managing the selected architecture; Preparing for design definition; Assessing alternatives for obtaining system elements; Establishing design characteristics and design enablers; Managing a system design;
- **Systems Integration:** Preparing, performing and managing system element implementation; Identifying, agreeing and managing system-level interfaces; Preparing and performing Integration; Managing integration results.
- **Verification and Validation:** Preparing and performing Verification; Managing verification results; Preparing and performing Validation; Managing Validation results; Preparing for, and performing System Transition; Managing results of System Transition; Obtaining Qualification, Certification and Acceptance.
- **System Operation and Maintenance:** Preparing for Operation; Managing results of Operation; Performing and supporting System/ Product Operation; Preparing for and performing Maintenance; Performing Logistics Support; Managing results of maintenance and logistics; Preparing for, performing and finalizing system disposal.



# SE Disciplines/Functional Areas Qualifying for SE Experience (2 of 2)

## Attachment A - Experience Applicable for Certification

- **Technical Planning:** Defining an SE project; Planning an SE project and its technical management; Activating an SE project; Identifying and recording tailoring influences and mandated structures; Obtaining input from parties affected by the tailoring strategy; Making Tailoring decisions and selecting life cycle processes.
- **Technical Monitoring and Control:** Planning for SE project assessment and control; Assessing SE projects; Controlling projects from an SE perspective; Preparing for and performing System Measurement; Preparing for system Quality Assurance; Performing system product or service evaluations;
- **Acquisition and Supply:** Acquisition, including: Preparing for system/element acquisition; Advertising the acquisition and selecting the supplier; Establishing, maintaining and monitoring an acquisition agreement; Accepting a product or service from a supplier; Supply, including: Preparing for supply; Responding to a tender; Establishing, maintaining and executing a supply agreement; Delivering and supporting a product or service.
- **Planning Information and CM:** CM; Performing Configuration Identification; Performing Configuration Change Management; Performing Configuration Status Accounting; Performing Configuration Evaluation; Performing Release Control; Information Management, including Preparing for and performing information management
- **Risk and Opportunity Management:** Planning technical risk and opportunity management; Managing the technical risk profile; Analyzing, Treating and Monitoring technical risks and opportunities
- **Lifecycle Process Definition and Management:** Establishing Lifecycle Processes including defining and implementing Lifecycle Models; Assessing Lifecycle Processes and Models; Improving Lifecycle Processes and Models.
- **Specialty Engineering:** Performing professional-level systems engineering activities associated with one or more Specialty Engineering area(s).
- **Organizational Project Enabling Activities:** Infrastructure Management, including establishing and maintaining the Infrastructure; HR Management; Quality Management; Knowledge Management; Project Portfolio Management at Organizational level.
- **Other:** Other functions and activities performed that you can justify as Systems Engineering activities.



# CSEP Certification Experience Requirements

- Systems Engineering Experience
  - **Minimum 5 years of professional level experience** in multiple SE functional areas (and any additional general years of experience necessary due to education status)
  - Minimum of **at least 1 year** of professional level SE experience in each of **3 or more** of the 14 SE functional areas
  - Must be documented on the INCOSE application form
- Experience Confirmation
  - Recommendations from **at least 3** colleagues / peers / managers
  - References must cover **at least 5 years and 3 areas** of SE experience claimed by the applicant (including any additional years)
  - References must **be knowledgeable in Systems Engineering** (or general engineering for any additional years)
  - Must be documented on the INCOSE reference form

**CSEPs should have experience in performing some, but not necessarily all, of the SE functional areas**



# Distribution of Systems Engineering Experience for CSEP

- The CSEP candidate must have at least 1 year of SE experience in each of 3 or more of the 15 systems engineering functional areas

**CSEPs should have experience in performing some, but not all, SE areas**

Option 1	A1	A2	A3			
Option 2	A1	A2	A3	A4		
Option 3	A1	A2	A3	A4	A5	
Option 4	A1	A2	A3	A4	A5	A6
Option X	A1	A2	A3	Applicant's Choice		
	1	2	3	4	5 Years	

**Some Options for Distributing Five Years of SE Experience in Various SE Functional Areas (A1, A2, etc.)**



# SCHOLAR

## **The Application**



# All of the Application Material is Available On-line

**Certification**

- Why Get Certified?
- Which Is Right For Me?
- The Certification Process
- Discounts & Agreements
- Certification Program History
- Certification Resources
- Certification Forms**
- Certification FAQs

## Certification Forms

Home / Certification / Certification Forms

*Note: these forms represent the initial application and renewal requirements for the INCOSE Systems Engineering Professional certification program as of their publication dates. If there are any conflicts between any other public certification information (e.g., the INCOSE certification website) and these forms, the content of these forms takes precedence. The INCOSE Certification Program Office is the final authority in the interpretation of the requirements on these forms.*

- [Initial Application for INCOSE ASEP or CSEP Certification](#)
- [Initial Application for INCOSE ESEP Certification](#)
- [Group Related Forms](#)
- [Appeals](#)
- [Renewal of INCOSE Systems Engineering Certification](#)
- [Special Accommodations Requests](#)
- [Click Here to Download Certification Payment Form](#)

### Initial Application for INCOSE ASEP or CSEP Certification

File	Type	Size	Date	Download
Application for ASEP Certification Form 1A	PDF	1.32 MB	16 Dec, 2015	<a href="#">Download</a>
Application for CSEP Certification Form 1	DOC	694.00 KB	10 Oct, 2014	<a href="#">Download</a>
Instructions for Filling Out CSEP Applications Form 2	PDF	73.19 KB	08 Oct, 2015	<a href="#">Download</a>
CSEP Certification Reference Endorsement Form 4B	PDF	148.35 KB	10 Oct, 2014	<a href="#">Download</a>
CSEP Instruction Letter to References Form 4A	DOC	518.00 KB	10 Oct, 2014	<a href="#">Download</a>

[Back to Top](#)

Download the forms from INCOSE website

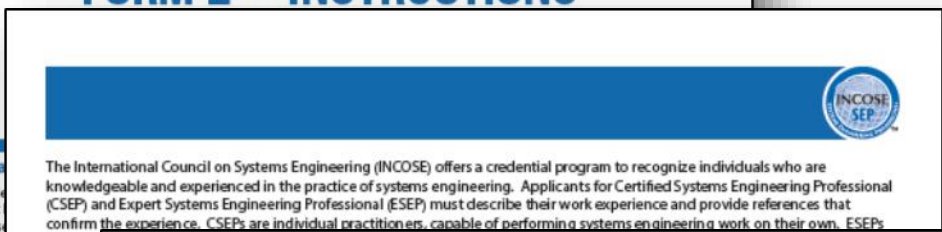
Instructions for Filling out ESEP Certification Application Form 42	PDF	79.66 KB	08 Oct, 2015	<a href="#">Download</a>
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- Application for CSEP Certification (separate form for ASEP)



- Instructions for Filling out CSEP Application



- Instruction Letter to References

**REFERENCE FOR CSEP / ESEP**

See Form 4A "Instructions to References" for guidance on filling out this form with your comments and recommendations on certification of the applicant.

**Applicant's Information**

Given Name / First Name	Family Name / Surname	Middle Initial
Email Address		Country

**Reference's Information**

Given Name / First Name	Family Name / Surname	
Email Address		Phone Number

- Certification Reference Endorsement Form

# Suggestions

- E-Mail prospective references – At least 5
  - All your references be SEs or at least someone able to “describe their knowledge of Systems Engineering that qualifies them to serve as references.”
  - Confirm their interest
  - Explain that they will need to describe their number of years and types of systems engineering experience they have had.
    - Not just their Job Titles but they need to explain what work they performed within the 15 Systems Engineering Experience Areas.

# E-mails

Dear so and so,

I'm applying for certification as a Systems Engineering Professional with the International Council on Systems Engineering (INCOSE). Part of the certification process requires three references who can attest to my systems engineering acumen. So I thought of you and how you can explain my work in *[place here Systems engineering function(s) i.e. Requirements Engineering]* for *[place here the activity you did i.e. the SpaceAge contract where I analyzed the customer comments against the system spec and went through the CM process in order to incorporate the changes.]*

They need a two week turn around so **before** I submit my application and start the clock I wanted to make sure my references were agreeable and available to help me out. So let me know if you can. No pressure if you're uncomfortable with the request or, more likely, too busy. Just let me know so I can keep looking around. Attached are the instructions and form so you'll know what you'll be asked to do.

Thanks for the consideration. Just let me know if you can or can't. If you can, I need the "reference's information" (mailing address, title, etc) so I can fill out the application. Don't fill out the forms until I send them to you again.

Let me know,

# Experience to Matrix

- Read and understand the 15 SE Work Areas or Functions or Roles outlined in ***Attachment A - Experience Applicable for Certification*** in the INCOSE Application Instructions.
  - Even if you feel you were not doing Systems Engineering at the time, it may still count if it falls into one of these 15 SE Work Areas.
- Take each of your Work Experiences and break them up into these SE Functions.
  - Use the language provided in the descriptions of the SE Functions in Attachment A when describing your experience.
- Estimate the amount of time, in months, you spend doing each SE Function.
  - If you find that during your assignments or positions you were doing more than one SE Function, then figure out a percentage of time you spent on each function

Section 5: Experience (Cont...)

# Experience to Matrix

Position 1 (most recent)

Organization	From Date	To Date	Calculated Months
WELKIN Associates, Ltd. (Subsidiary of CSC)	01/2003	08/2006	43

Supervisor Name	Supervisor Title	Supervisor Phone
Tom Kelly	Vice President	

Your Title/Position	Names of Reference(s) for This Work Experience
Senior Systems Engineer	Mike Grieco, Victor L. Harrison



Notice the form will calculate the Total Numbers of Months. The bottom cell of P1 in matrix cannot exceed this.

Summarize your role and system of interest.  
Assigned as a Senior Systems Engineer on a sub-contract to a Lockheed Martin contract with a DoD Agency. Worked at an enterprise system level.

Revised 1 July 2017 Form 1 - Application for CSEP



+ Choose functional area **Technical Planning** Months worked **12**

- I prepared a program Integrated Master Schedule by using Primavera, an enterprise level program management tool, to input, status and update. I identified the schedule program metrics, measured and presented them to the customer at the monthly Program Management Review.



This is put into Experience Matrix

+ Choose functional area **Lifecycle Process Definition and Management** Months worked **9**

- I developed a Compliance-Verification and Facilitation process to supported the Agency Enterprise Standards Program. The process accessed system developers in their use of standards in relation to Enterprise infrastructure architecture.



This is put into Experience Matrix

+ Choose functional area **Specialty Engineering**

- I developed training material and taught class...

- I developed generic model for accessing...

# Experience to Matrix

Work in Months by Position and SE Area	P1	P2	P3	P4	P5	P6	P7	Total Months of Effort in Each SE Area
<b>SE Functional Areas</b>								
Requirements Engineering	0	0	0	8	0	0	0	8
System and Decision Analysis	0	0	0	0	0	0	0	0
Architecture/ Design Development	4	0	1	12	0	0	0	17
Systems Integration	0	0	0	12	0	0	0	12
Verification and Validation	0	0	0	0	0	48	0	48
System Operation and Maintenance	0	0	0	0	0	0	0	0
Technical Planning	24	0	0	0	0	0	0	24
Technical Monitoring and Control	0	0	0	0	18	0	0	18
Acquisition and Supply	0	0	0	0	0	0	0	0
Information and Configuration Management	0	0	5	0	8	0	0	13
Risk and Opportunity Management	0	0	0	0	6	0	0	6
Lifecycle Process Definition and Management	9	0	0	6	0	0	0	15
Specialty Engineering	4	0	0	0	0	0	0	4
Organizational Project Enabling Activities	0	0	0	0	0	0	0	0
Other	0	1	0	0	0	0	0	1
<b>Total Months of SE in Position (documented)</b>	<b>41</b>	<b>2</b>	<b>6</b>	<b>38</b>	<b>32</b>	<b>48</b>	<b>0</b>	<b>167</b>
<b>Total Months in Position (calendar)</b>	<b>43</b>	<b>2</b>	<b>6</b>	<b>38</b>	<b>54</b>	<b>62</b>		

**Under P1 in Matrix**  
 The form transferred the months I worked in Section 5: Experience

# Experience to Matrix

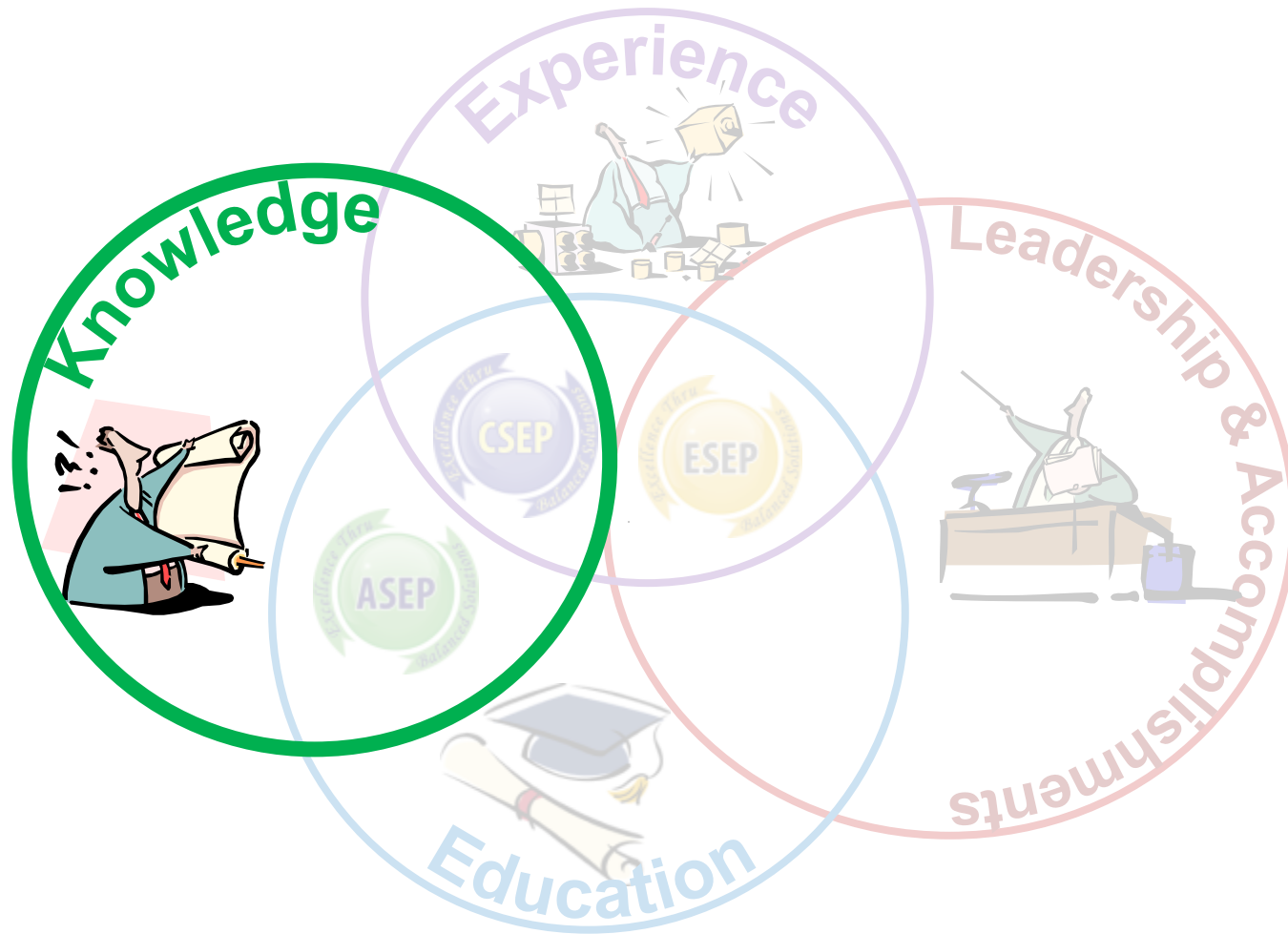
Work in Months by Position and SE Area	P1	P2	P3	P4	P5	P6	P7	Total Months of Effort in Each SE Area
<b>SE Functional Areas</b>								
Requirements Engineering	0	0	0	8	0	0	0	8
System and Decision Analysis	0	0	0	0	0	0	0	0
Architecture/ Design Development	4	0	1	12	0	0	0	17
Systems Integration	0	0	0	12	0	0	0	12
Verification and Validation	0	0	0	0	0	48	0	48
System Operation and Maintenance	0	0	0	0	0	0	0	0
Technical Planning	24	1	0	0	0	0	0	25
Technical Monitoring and Control	0	0	0	0	18	0	0	18
Acquisition and Supply	0	0	0	0	0	0	0	0
Information and Configuration Management	0	0	5	0	8	0	0	13
Risk and Opportunity Management	0	0	0	0	6	0	0	6
Lifecycle Process Definition and Management	9	0	0	6	0	0	0	15
Specialty Engineering	4	0	0	0	0	0	0	4
Organizational Project Enabling Activities	0	0	0	0	0	0	0	0
Other	0	1	0	0	0	0	0	1
<b>Total Months of SE in Position (documented)</b>	<b>41</b>	<b>2</b>	<b>6</b>	<b>38</b>	<b>32</b>	<b>48</b>	<b>0</b>	<b>167</b>
<b>Total Months in Position (calendar)</b>	<b>43</b>	<b>2</b>	<b>6</b>	<b>38</b>	<b>54</b>	<b>62</b>		

## Total Months of Effort in Matrix

- The key is to ensure you have 12 months or more of SE experience in each of 3 or more of the 15 systems engineering functional areas (I could have stopped after P4)



# Certification Knowledge Requirements



**These elements of the INCOSE certifications are measurable tangible parameters consistent with ISO guidelines for a certification program.**

# Certification Knowledge Requirements

- CSEP/ASEP Exam Basis
  - “We recommend study of the current version of the INCOSE Systems Engineering Handbook which is the reference document for the certification examination.” *Taken from INCOSE Certification Program FAQs*
- Exam is
  - 2 hours in length
  - 120 questions
  - Administered electronically at world-wide Prometric locations
  - Pass/Fail results provided immediately upon exam completion
- Candidates are eligible for two re-tests within one year of application submittal



**The INCOSE Systems Engineering Handbook is the basis for the CSEP & ASEP exams.**



# Representative Exam Questions

“The certification examination questions are currently multiple-choice questions. All correct answers must be selected from the possible answers given to receive credit for answering a question. A typical question may have five possible answers listed of which three are correct. Partial credit is not given for a question..” *Taken from INCOSE Certification Program FAQs*

- Which three of the following are methods to express functional behavior? (Choose three)
  - A. Network Tree (NT)
  - B. Behavior Diagram (BD)
  - C. Allocated Requirement Diagram (ARD)
  - E. Functional Flow Block Diagram (FFBD)
  - F. Integrated Definition for Functional Modeling (IDEF) Diagram
- Which are three justifications for CM? (Choose three)
  - A. facilitates communication
  - B. forces change evaluations
  - C. prevents requirements changes
  - D. controls requirements changes
  - E. encourages requirements changes

Note: These questions **ARE NOT** from the INCOSE Certification Exam. The format and content are similar (based on SEH v2A). They were created by CSM and Prometric to show question structure.



# Representative Exam Questions

- Sample Questions from INCOSE
  - <https://www.incose.org/docs/default-source/certification/sample-questions.pdf>
- Performed poorly in the 2014 beta exams.
- Representative of the format and content on the actual exam
- Assist in understanding how the INCOSE exam is structured.

Sample Exam Questions 2015

The INCOSE Certification Program Office has committed to release sample test questions to help guide applicants and training providers in understanding the format of the INCOSE knowledge exam. The following questions and answers are not planned to be used by the INCOSE Certification Program because of how they performed when tested on candidates in the 2014 beta exams. They are representative of the format and content on the actual exam and can be used by knowledge exam candidates to assist in understanding how the INCOSE exam is structured.

1. How may a system operator use a system to sustain engineering?
  - A. by reviewing verification analysis
  - B. by reviewing operator procedures
  - C. through monitoring system performance data
  - D. through monitoring the number of trained operators
2. Which two are commonly evaluated as part of the Project Assessment Process? (Choose two.)
  - A. the network security policy
  - B. the standards applied to the project
  - C. the availability of necessary resources
  - D. the availability of management to the project
  - E. the compliance with project performance measures
3. What is an example of the wasteful practice of over-processing?
  - A. Members of a team are split between three physical facilities.
  - B. The vendor ships four rocket motors to a launch site two years before they are needed.
  - C. An engineer takes a released interface document and reformats it to match a format previously worked.
  - D. A valve is selected by an engineer to meet a deadline and is found to be incompatible, requiring a subsystem redesign.
4. What are two practices an organization should avoid on a specific project? (Choose two.)

# Getting the Handbook

- The INCOSE SE Handbook Fourth Edition digital copy is available for download from the INCOSE Store
  - INCOSE member
  - employees of CAB organizations,
  - students of Academic Council members.
- Member Log In at the INCOSE website.
- Proceed to the INCOSE Store
  - You will be required to "purchase" the item.
  - File will then be located in your Profile Home in your Digital Library
- The hard copy is only available at the Wiley Store.
  - The Individual Member Discount Code is available in the INCOSE Store as a digital download purchase.
  - 55% off



## Systems Engineering Handbook v4 (Soft Copy)

Digital Download - Members Only

Price: **Not Available for Non-Members**

Member Price: **\$0.00**

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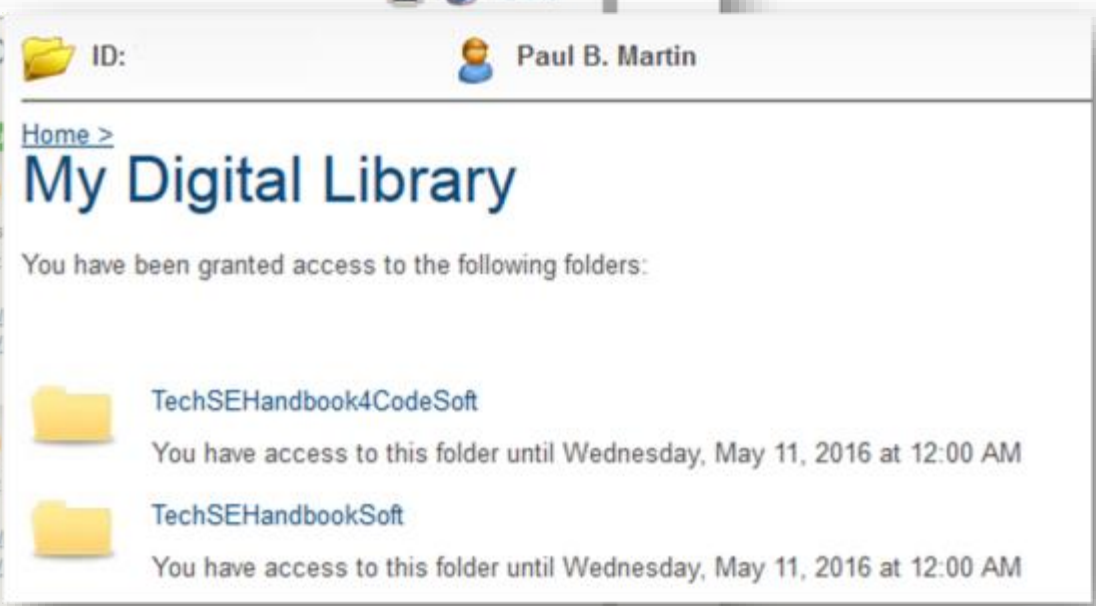
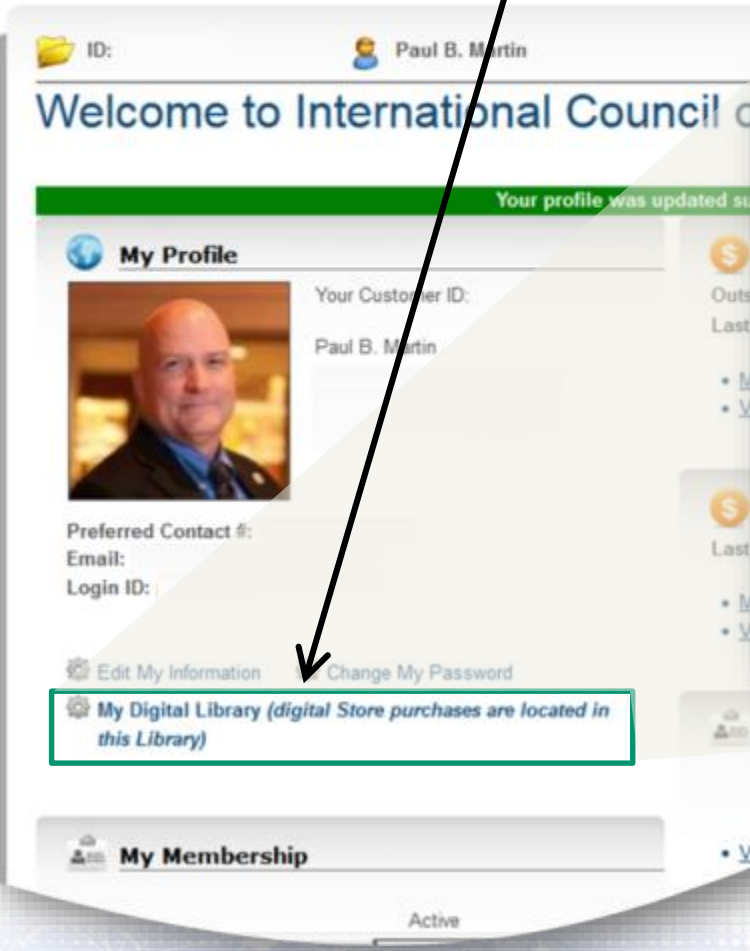
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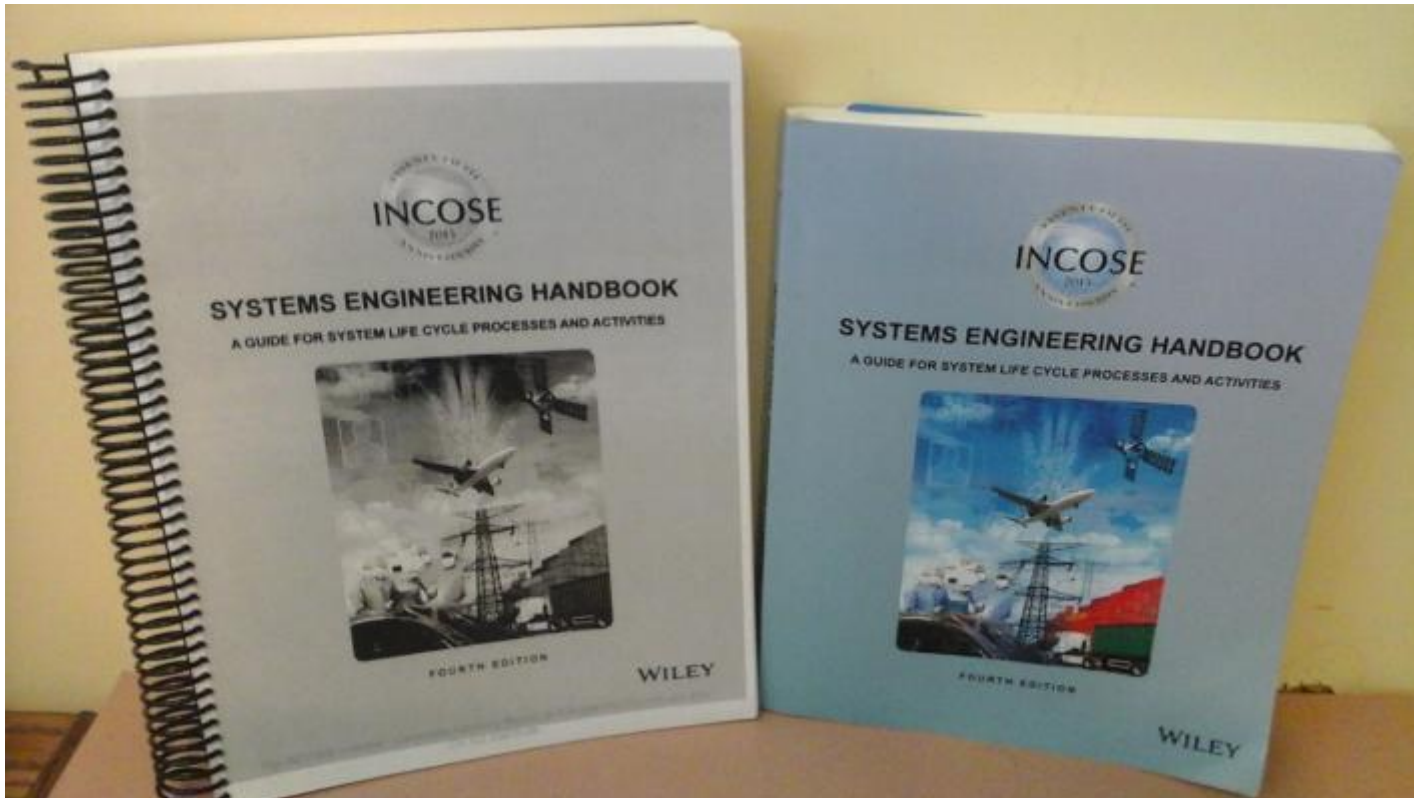
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## To access what you purchased

# Getting the Handbook

- Here's a suggestion, take the pdf version of the Handbook and get a spiral bound double sided copy made at Office Depot or Staples (~ \$45).



# Preparing for the Exam

- Study the INCOSE SE Handbook
- Sign-up for my On-Line Class
  - Learn the framework of the 31 Processes within the INCOSE SE Handbook vs 4.0.
  - Have access to dozens of practice Quizzes.
  - Start to appreciate the context of Systems Engineering



# The on-line class takes place in a open, easy-to-use, cloud-native Learning Management System

2016\_INCOSE\_SEP\_Exam\_Prep\_Course

**Home** INCOSE SEP Exam Prep Course (for Version 4.0 Handbook)

**INCOSE**  
ENCHANTMENT CHAPTER

Welcome

Thank you for signing up for my **INCOSE SEP Exam Preparation Course**. This course will cover the entire INCOSE SE Handbook vs. 4.0, which is the basis of the INCOSE Certification Exam.

Here are some Navigation Tips for this Canvas Class Portal:

- On the left is a **Assignments (or Modules)** link where you can get your reading assignments and the pre-

**CONTENT ACCESS 24/7**

INCOSE accepts your application, call Prometric and schedule your exam for a week after the last class

Put a line in the sand!

- Class 2: Introduction to Systems Engineering and the Life Cycle Model
- Class 3: SE Approaches
- Class 4: Project Planning
- Class 5: Project Processes
- Class 6: Requirements
- Class 7: Design
- Class 8: Technical Processes

**Course Modules**

- Class 1: Understanding the INCOSE Certification Process [For those who missed the Webinar]
  - Application Help (if you missed the Webinar)
- Class 2: Introduction to Systems Engineering and the Life Cycle Model
  - Class 2 Reading Assignment
  - Class 2a (Pre-Class Quiz)
  - Class\_2\_SE\_Overview-(SE-Scholar)-2-per-handout.pdf
  - Class 2b (Post-Class Quiz)
- Class 3: SE Approaches
  - Class 3 Reading Assignment
  - Class 3a (Pre-Class Quiz)
  - Class\_3\_SE\_Approaches-(SE-Scholar)-2-per-handout.pdf
  - Class 3b (Post-Class Quiz)
- Class 4: Project Planning
  - Class 4 Reading Assignment
  - Class 4a (Pre-Class Quiz)
  - Class\_4-Project\_Planning-(SE-Scholar)-2-per-handout.pdf
  - Class 4b (Post-Class Quiz)

Over 14 Hours of recordings of previous on-line classes are available for you to watch at your convenience. Learn the material at your pace and in your time frame.



Lecture 4: Project Planning from an SE POV



INCOSE Systems Engineering Professional (SEP) Exam Preparation ORGANIZATIONAL PROJECT ENABLING PROCESSES

### 7.5 Quality Management [QM] Process

The purpose of the Quality Management process is to assure that products, services and implementations of the quality management process meet organizational and project quality objectives and achieve customer satisfaction.



# RECORDED CLASSES



Any questions? Use Discussion Board in Canvas and e-mail to: [info@se-scholar.com](mailto:info@se-scholar.com)

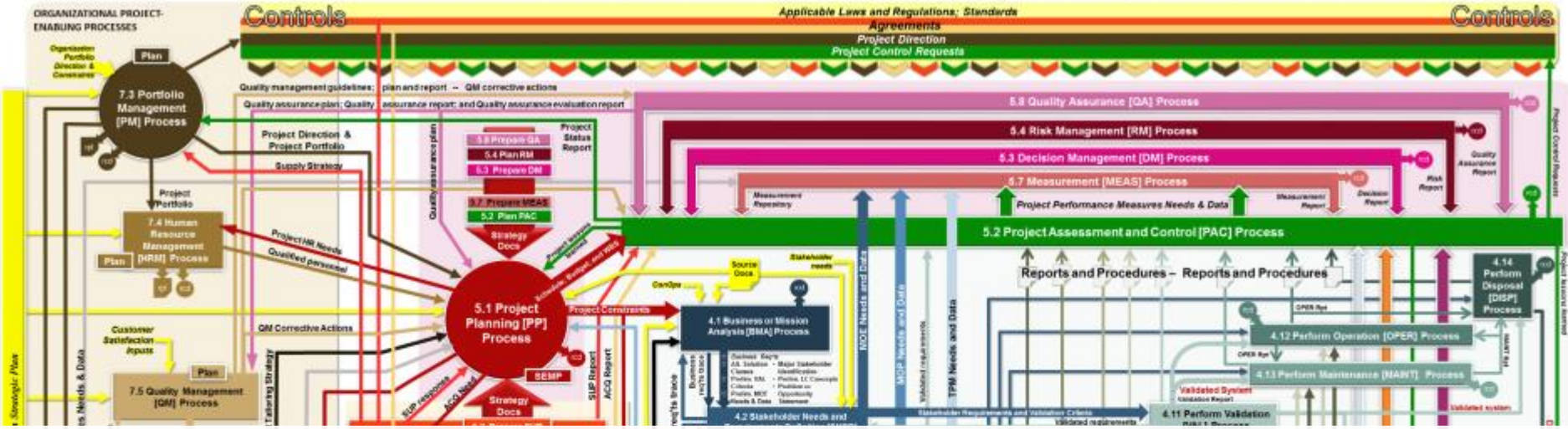
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From INCOSE Systems Engineering Handbook v. 4.0  
From INCOSE Systems Engineering Handbook v. 4.0

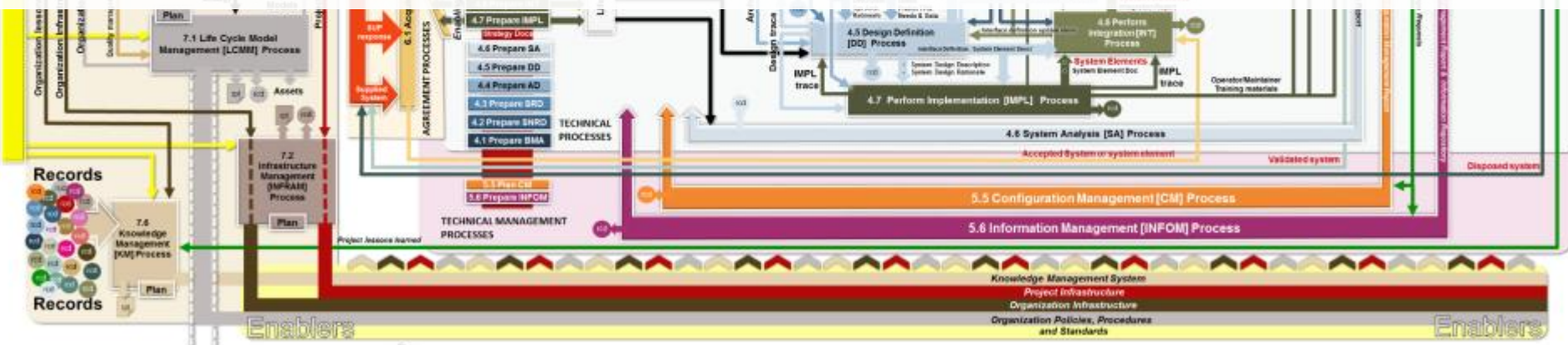
Lecture 4: Project Planning

11  
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### Process Flow Block Diagram - based on INCOSE Systems Engineering Handbook v. 4.0



**We use a Comprehensive Process Flow diagram of all 31 Processes from Handbook**



## To get a sense of what the Exam is like, we provide numerous Quizzes as well as a 120 Question practice Exam.

The screenshot shows a quiz interface for 'Class 2a (Pre-Class Quiz)'. The quiz started on Dec 31 at 11:02am. The main question is 'Question 1' worth 1 point, asking for three phrases from the INCOSE definition of Systems Engineering. The options are:

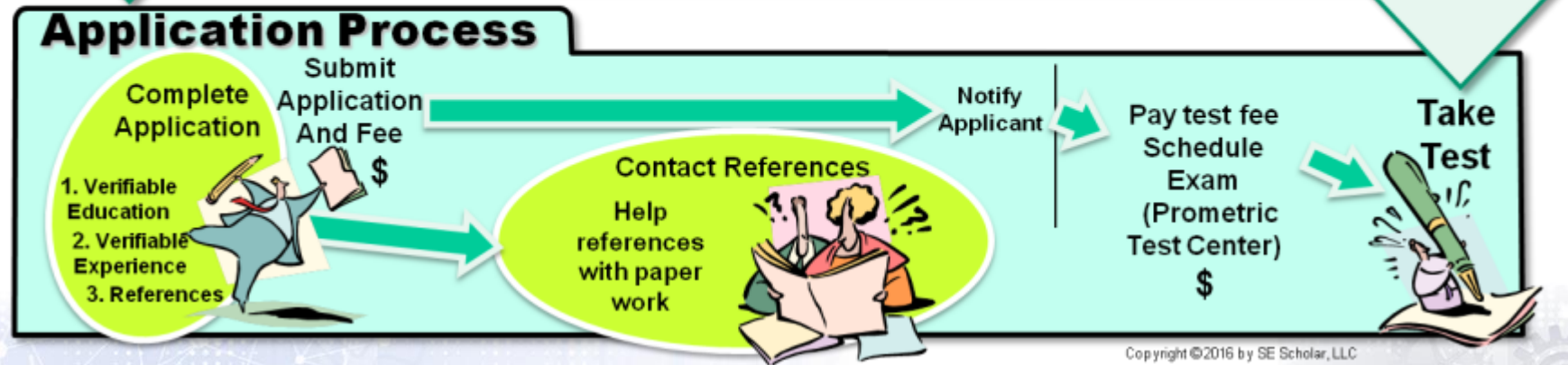
- focuses on defining customer needs and required functionality early in the development cycle
- set of interrelated or interacting activities that transform inputs into outputs
- considers both the business and the technical needs of all customers
- an interdisciplinary approach and means to enable the realization of successful systems.
- failure is not an option for implementing the required processes

On the right, a 'Questions' sidebar lists questions 3 through 11. At the bottom, a 'Next' button is visible. A status bar at the bottom of the quiz area shows 'Quiz saved at 11:03am' and a 'Submit Quiz' button.

**Check out the Sample Quiz from my Course**

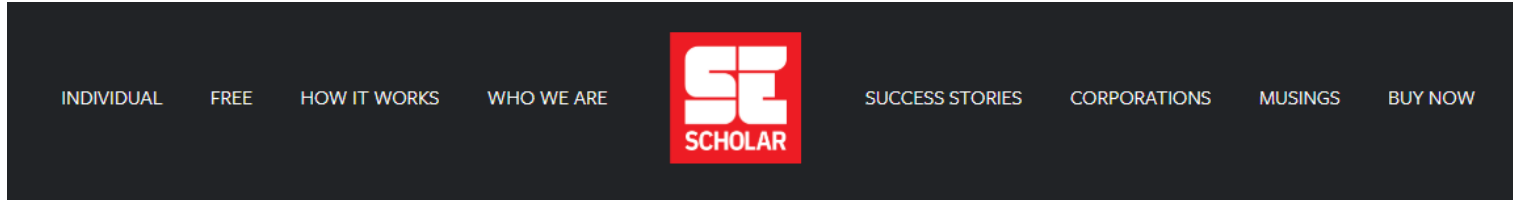
# The 7 Classes cover the entire Handbook

App Prep Webinar	Examination Preparation			
	Week 1	Week 2	Week 3	Week 4
Pre-class	Pre Class Quiz	Pre Class Quiz	Pre Class Quiz	Pre Class Quiz
<b>Class 1</b> Certification Overview & Application Help	<b>Class 2</b> SE Overview & LC Stages	<b>Class 4</b> Project Planning	<b>Class 6</b> Requirements	<b>Class 8</b> Tech Processes
Submit Application	After Class Quiz	After Class Quiz	After Class Quiz	After Class Quiz
	Pre Class Quiz	Pre Class Quiz	Pre Class Quiz	After Class
	<b>Class 3</b> SE Approaches	<b>Class 5</b> Tech Management	<b>Class 7</b> Design	120 Question Practice Exam
	After Class Quiz	After Class Quiz	After Class Quiz	

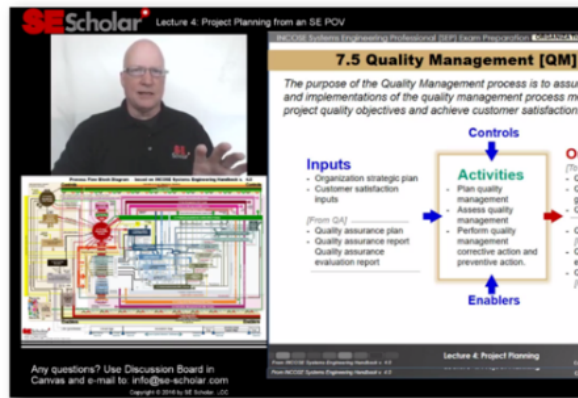


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# Sign-up at SE Scholar Website



## WWW.SE-SCHOLAR.COM



## INCOSE SEP Exam Preparation Course [Self Paced Video version]

\$650.00

An on-line course consisting of 7 modules and 10 hours of instructional videos, covering the INCOSE Handbook vs 4.0. Includes study guides, a Quality Management Process Flow diagram, practice quizzes and more. Access the material at your pace and in your time.

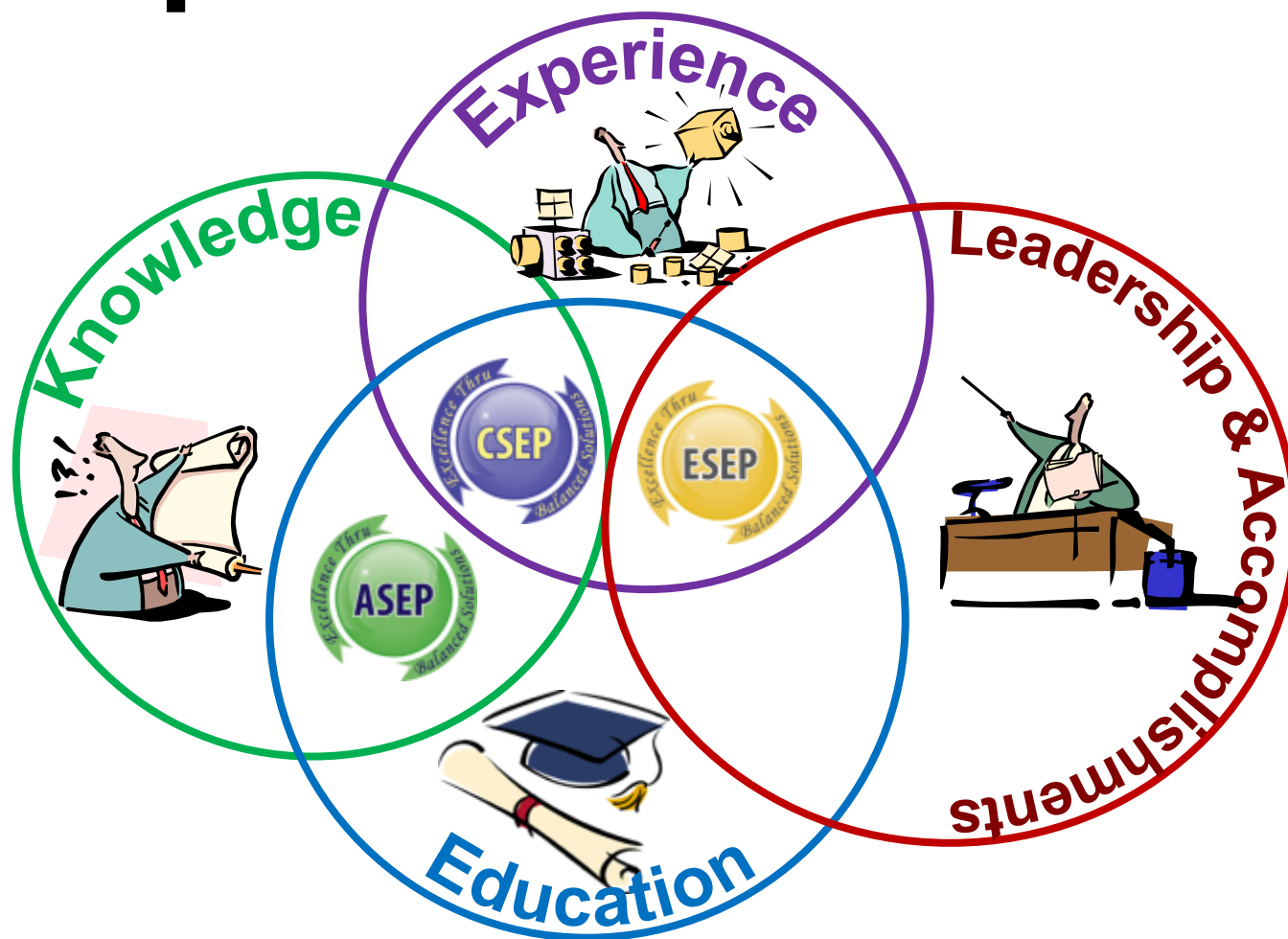
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Use the Discount Code:  
**ENCHANTED19**  
for a \$150 off regular price

**Good until March 31st**

# Key Requirements of Certification



**These elements of the INCOSE certifications are measurable tangible parameters consistent with ISO guidelines for a certification program.**

# So What Level of Certification is Right for You?



- If you have just started (or plan to start) practicing systems engineering or have recently graduated and are interested in systems engineering






- If you are a practicing Systems Engineer with more than five years of systems engineering professional work experience



- If you are a systems engineering leader with recognized systems accomplishments and have many years of systems engineering professional work experience



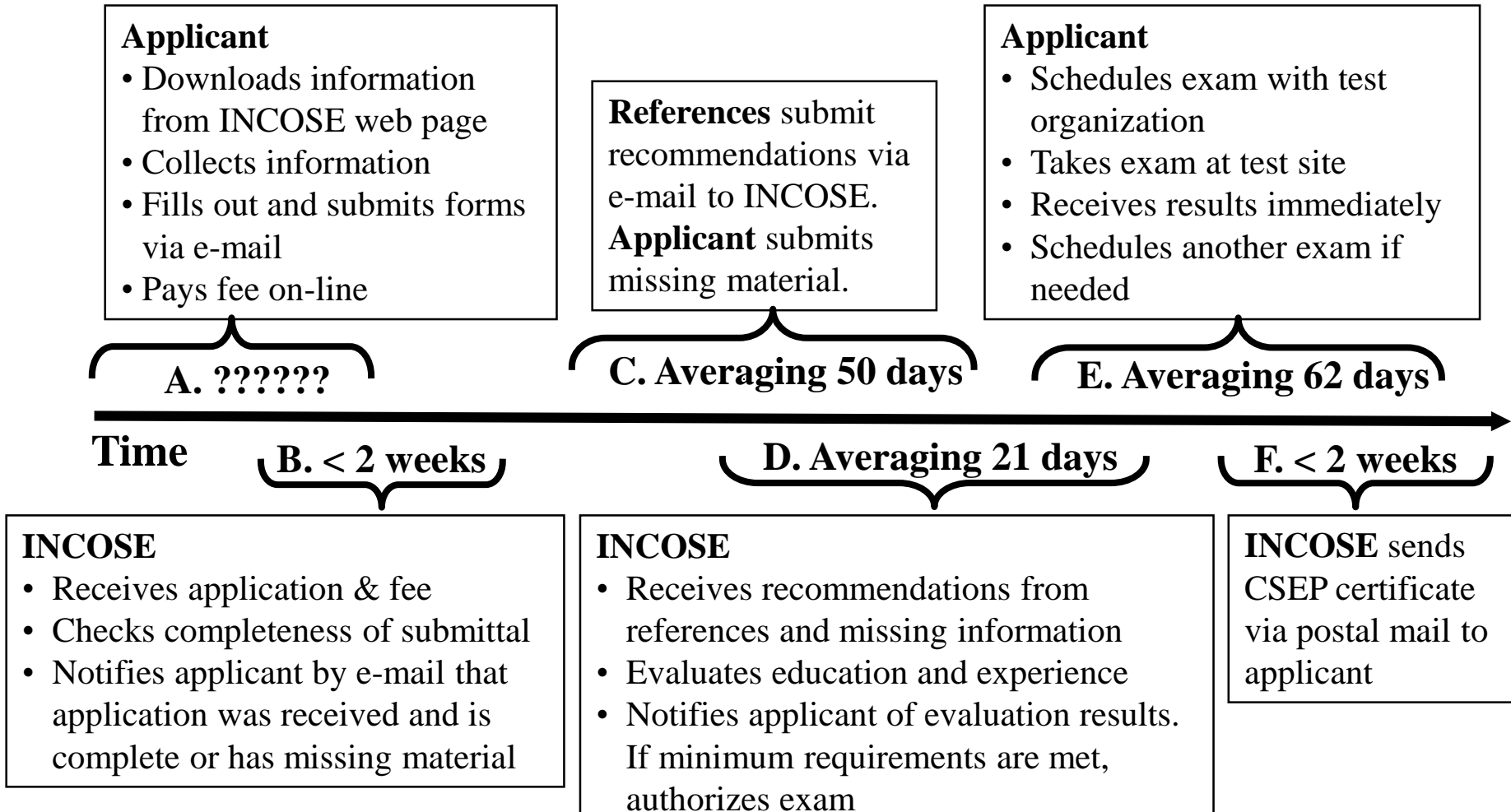
# The Key Elements of INCOSE Certification (What is Certified?)

	SE Knowledge	Education	SE Experience	SE Leadership & Accomplishments
	Via an exam based on the INCOSE SE Handbook			
	Via an exam based on the INCOSE SE Handbook	Via confirmation of technical degree (or additional experience, if required)	Via confirmation of applicant's and references written experience claims	
		Via confirmation of technical degree (or additional experience, if required)	Via confirmation of applicant's and references written experience claims	Via oral review of applicant (and references, if required)

**These four elements (education knowledge experience education, knowledge, experience, and leadership & accomplishments) allow for a variety of SE certifications to be earned.**

# How Long Will It Take to Get Certified?

There is no one answer. Much depends on the applicant.



**While the times vary, the average time for CSEP is ~200 days.**

# Certification Renewal Requirements

- Certification is Valid for
  - 3 Years for CSEP and must maintain INCOSE membership
  - 5 Years for ASEP and must maintain INCOSE membership
  - Indefinite for ESEP, but must maintain INCOSE membership
- Certification renewal requires
  - Minimum of 120 Professional Development Units (PDUs)
  - Renewal application
  - Continuing education log submittal
  - Must be submitted before current certification period ends
  - Up to 30 “excess” PDUs can be “carried forward”

**INCOSE Certified professionals have an ongoing growth and learning obligation**

# PDUs for Certification Renewal (1 of 2)

Professional Development Activities	Credit	Renewal Limit
<b>Technical Society Participation Category</b>		
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

*(all must be relevant to the practice of systems engineering) (Proof of all activities required if audited)*

# PDU for Certification Renewal (2 of 2)

Professional Development Activities	Credit	Renewal Limit
<b>SE Course Work &amp; Publication Category</b>		
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 5 PDU/year limit	15 PDU
<b>SE Job Function Participation Category</b>		
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 (10 PDU/year limit)	30 PDU

*(all must be relevant to the practice of systems engineering) (Proof of all activities required if audited)*

# All of the **Renewal Material** is Available On-line

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[Certification Program History](#)

## Certification Forms

*Disclaimer: these forms represent the official application and renewal requirements for the INCOSE Systems Engineering Professional certification program as of their publication dates. If there are any conflicts between any other public certification information (e.g., the INCOSE certification website) and these forms, the content of these form takes precedence. The INCOSE Certification Program Office is the final authority in the interpretation of the requirements on these forms.*




- [Initial Application for INCOSE ASEP or CSEP Certification](#)
- [Initial Application for INCOSE ESEP Certification](#)
- [Group Related Forms](#)
- [Appeals](#)
- [Renewal of INCOSE Systems Engineering Certification](#)
- [Special Accommodations Requests](#)

Note: If error message is received when downloading forms, please right-click and press "save as" to save the document. Internet Explorer is the preferred browser.

If located in the UK, please apply for Certification directly through the UK Chapter site:  
[http://incoseonline.org.uk/Program\\_Files/Certification/Select\\_Cert.aspx?CatID=Certificate](http://incoseonline.org.uk/Program_Files/Certification/Select_Cert.aspx?CatID=Certificate)

For Certification inquiries in the UK, please email [profdev@incoseonline.org.uk](mailto:profdev@incoseonline.org.uk).

### Initial Application for INCOSE ASEP or CSEP Certification

File	Type	Size	Date	Download
Form 1B - Reference for CSEP - ESEP	PDF	461.65 KB	02 Aug, 2017	 <a href="#">Download</a>
Form 1A Individual Application for ASEP	PDF	976.86 KB	10 Oct, 2017	 <a href="#">Download</a>
Form 1 Individual Application for INCOSE CSEP	PDF	1003.79 KB	10 Oct, 2017	 <a href="#">Download</a>

Download the forms from INCOSE website

# By the Way

- A lot of information in this brief came from an INCOSE Overview Brief

- Can find the original at the INCOSE SEP website:

[INCOSE Certification Resources](#)



# Any Questions?

