

# SYSTEMS ENGINEERING TOOLKIT

The Systems Engineering Toolkit helps engineers more effectively execute their tasks. From planning through execution, the sessions arm engineers with practical principles and applications aimed at the efficient production of high-quality products that meet established requirements. Industry specific examples, tools, and topics will be woven into the curriculum as students work on real-world projects aligned with organizational strategic initiatives.

## TOOLKIT BENEFITS

- Fully supported training program that can be custom-designed to meet your company's needs
- Plan out engineering projects within a defined schedule and cost
- Employ appropriate configuration, data and risk management techniques
- Learn proper use of requirements analysis, allocation and traceability in systems engineering
- Develop knowledge of the functional analysis process and system functional allocation
- Accurately apply system test and validation methodologies

## KEY PROGRAM TOPICS

- Project Engineering Overview
- Management, Control and Organization
- Systems Requirements
- System Synthesis and Functional Allocation
- System Architecture and Interface Definition
- Elective Session
- System Specialty Topics
- Application of Systems Thinking Concepts

## LEARN MORE

Corporate Education and Custom Training  
(858) 534-9355 | [corped@ucsd.edu](mailto:corped@ucsd.edu)

[extendedstudies.ucsd.edu/custom-programs](https://extendedstudies.ucsd.edu/custom-programs)

**UC San Diego**  
EXTENDED STUDIES

# PUT THE POWER OF UC SAN DIEGO EXTENDED STUDIES TO WORK FOR YOU

Every successful organization needs skilled workers and an evolving pipeline of talent to draw from to keep pace with a quickly changing workplace. When a company makes education a top priority, everyone wins. Employees are more skilled and confident. Teams perform better. Organizations increase the capacity and value of their workforce when employees become more intuitively and analytically competent.

UC San Diego Extended Studies custom training empowers workforces and helps businesses identify organizational skills gaps creating a tactical training plan to fill them.

Some of San Diego's most successful companies use customized training from UC San Diego Extended Studies to inject their organization with concise, up-to-date competencies that help them reach their goals faster and smarter than their competitors.

## ADDITIONAL INFORMATION

- Ten 4-hour sessions equal to 4 CEU's that may be used for maintaining credentials or licenses
- Course credit may be applied toward our Certificate in Systems Engineering
- Pricing varies with # of participants and electives chosen, includes materials (minimum of 15 recommended)
- Provides Professional Development Units (PDU's) for INCOSE Certification renewal
- Program delivery options include onsite, on campus, online or hybrid

## ABOUT UC SAN DIEGO DIVISION OF EXTENDED STUDIES

- Extended Studies is the Continuing Education and Outreach arm of UC San Diego serving local and international communities
- UC San Diego is ranked among the world's top universities
- Over 25 years of success with Toolkits in Engineering, Leadership, and Project Management
- All courses, programs, and instructors meet rigorous UC San Diego academic requirements
- Staff and instructors can assist in performing a Training Needs Analysis to ensure all instruction is applicable and deliverables are met

### LEARN MORE

Corporate Education and Custom Training  
(858) 534-9355 | [corped@ucsd.edu](mailto:corped@ucsd.edu)  
[extendedstudies.ucsd.edu/custom-programs](https://extendedstudies.ucsd.edu/custom-programs)

**UC San Diego**  
EXTENDED STUDIES

## CORPORATE TRAINING BENEFITS



**Private:** Offered exclusively to organizations for their employees



**Custom:** Curriculum tailored to the challenges of each organization



**Turnkey:** Extended Studies will handle administrative details from beginning to end



**Flexible:** Schedule, Location, and Delivery are customized for each cohort's needs



**Cohesive:** Employees learn new skills and develop a common language together



**Proven:** 1000's of professionals apply our training in their organizations yearly





## OUTLINE OF INSTRUCTIONAL TOPICS

---

### **Project Engineering Overview**

- Systems engineering process
- Engineering "V" and spiral process
- Program planning and control

### **Management, Control and Organization - I**

- Organizational structure
- Work breakdown structure
- Schedule and cost control
- Cost as an independent variable (CAIV)

### **Management, Control and Organization - II**

- Configuration management
- Data management
- Risk management

### **System Requirements**

- Importance of performance objectives
- Requirements analysis
- Requirements allocation
- Requirements traceability

### **System Synthesis and Functional Allocation**

- Basics of the functional analysis process
- System functional allocation
- Interface requirements and specifications
- System test and validation methodology
- Importance of modeling and simulation

### **System Architecture and Interface Definition**

- Basics of the system design process
- HW/SW design and functional allocation
- System integration and test
- System factory acceptance testing

### **System Specialty Topics**

- Reliability and availability
- Maintenance and logistics support
- Application of 6-sigma/CMMI/ISO standards

### **Application of Systems Thinking Concepts**

- Importance of systemic and analytical views
- Identification of high leverage points (HLP)
- Reinforcement and balancing structures
- Cooperative and competitive structures

### **Program Elective (select one)**

- Systems Verification & Validation
- Agile Software Development
- Systems Thinking and Proposal Support

### **Final Session**

- Effective product development techniques
- Project organizational structures
- In-class project presentations
- Final exam