

# Essential SysML Applied™ Workshop

## — Tool-independent edition —

**Accelerate your SysML project with this intense, interactive workshop that emphasizes pragmatic modeling principles and techniques, and shows how to apply them using any SysML-compliant modeling tool.**

The **Systems Modeling Language (SysML)** is a dialect of the **Unified Modeling Language (UML)** tailored for **systems engineering applications** that has been standardized by the Object Management Group as **OMG SysML™**. The SysML dialect of UML has two significant advantages over its parent language. First, it is a smaller language than UML since it has fewer diagrams and constructs, so it is easier for modelers to learn and apply. Second, SysML adds two new diagrams for defining Requirements and Parametric Constraints as first-class constructs, so it allows modelers to automate requirement verification and simulate cost/performance trade studies.

This introductory SysML workshop **provides students with a solid foundation for applying Model-Based Engineering principles and best practices with SysML**. The workshop teaches students **how to solve practical problems using all SysML diagram types and Allocation Tables**. Learning modules are punctuated with frequent Q&A sessions and hands-on practice exercises. Students who desire integrated modeling tool training may also choose versions of this workshop that are customized for popular SysML modeling tools. (For a list of workshops customized for popular visual modeling tools and for advanced SysML training see the [Training](#) page of the PivotPoint web).

### WHY TRAIN WITH US? – PIVOTPOINT TRAINING ADVANTAGES

- PivotPoint workshops are **authored and taught by Model-Based Engineering experts** with 10+ years practical application experience.
- PivotPoint workshops are **intense (high Instructor/Student ratio) and pragmatic—punctuated with frequent Q&A sessions and hands-on practice exercises**.
- PivotPoint workshops are **based on proven tool-independent principles and techniques**, so you can learn a leading modeling language or architecture framework with/without a modeling tool. (For a list of workshops customized for popular visual modeling tools see the *Training* page on the PivotPoint web.)
- PivotPoint workshops are **modular and can be customized to meet your team and project needs**. To begin with, you can pick-and-choose your modeling language, and then select from modeling tool and architecture framework training options.
- PivotPoint workshops **offer flexible choices of venues (onsite, offsite, webconference) and durations (#days)**.

For more details about the advantages of PivotPoint's Model-Based Engineering training check out the [“Why Train with Us?”](#) page on the PivotPoint web. But don't just take our word for it; you should also check out the [Client Testimonials](#) page on our web.

Workshop **learning objectives, prerequisites, syllabus, and logistical information** are described below.

## WHAT WILL YOU LEARN?

- What is SysML and why do we model systems?
- SysML's basic and advanced constructs for modeling requirements, structure, and behavior
- How SysML can model large, complex systems
- How SysML can specify the full system engineering lifecycle: requirements through testing
- Practical guidelines for specifying correct, complete, clear, concise, and consistent models
- How to Verify & Validate (V&V) a SysML model
- How you can customize SysML for specific domains, such as aerospace-defense, manufacturing, and communications.
- How SysML can be used with object, component-based and structured analysis/design methods
- How to select SysML tools and methods
- How to draw and simulate/execute SysML using a selected SysML tool (optional; see popular visual modeling tools supported on the *Training* page of the PivotPoint web)
- How to learn more about SysML modeling

## WHO SHOULD PARTICIPATE?

Systems engineers, system architects, software architects/engineers/developers, project managers, and others who want to learn how the SysML can improve how they architect, analyze, design, and manage complex systems will benefit from this workshop.

**PREREQUISITES:** Systems or software engineering experience in building large, complex systems. Experience using one or more structured analysis/design, object or component methods is desirable.

## WORKSHOP AUTHOR & CHIEF INSTRUCTOR



**Cris Kobryn** is the CEO and Founder of PivotPoint Technology Corporation, a company that specializes in Model-Based Engineering Solutions™ for tough business and engineering problems. He is an internationally recognized expert in visual modeling and Model-Based Engineering, and has successfully applied these technologies to diverse industries ranging from aerospace-defense and communications to financial services and manufacturing. Cris chaired large international teams of vendors and users to specify the Unified Modeling Language (UML) 1.x and 2.0 standards for software engineering, and the Systems Modeling Language (SysML) 1.0 standard for systems engineering. In recognition of Cris's contributions to the UML the Object Management Group (OMG) presented him with its Distinguished Service Award, and in acknowledgement of his contributions to the SysML the International

Council on Systems Engineering (INCOSE) presented him with its Outstanding Service Award.

**WORKSHOP SYLLABUS:** The workshop syllabus, in a menu form that can be customized to meet your team/project needs, is described at the end of this document. NOTE: This workshop description and syllabus are subject to revision. Check the *Training* page on the PivotPoint web for the most recent update.

**FLEXIBLE VENUES:** All of our workshops are available onsite (at a Client training facility), offsite (at a PivotPoint training facility), and via webconference.

**FOLLOW-UP CONSULTING/MENTORING SERVICES:** All of our workshops can be followed up with consulting/mentoring services that will keep your Model-Based Engineering project on track. Please check out the Consulting services page on the PivotPoint web, or contact us to discuss details.

**SCHEDULING AND COST:** Workshops must be reserved in advance by Purchase Order or prepayment. We generally require at least 4 weeks lead time for scheduling workshops, but longer lead time is desirable to reserve your preferred training dates. Workshop cost depends upon workshop duration (number of days), venue choice (onsite, offsite, webconference), and number of students.

**FURTHER INFORMATION & PRICE QUOTES:** Please visit our web site at [www.PTCorp.com](http://www.PTCorp.com), email us at [workshops@PTCorp.com](mailto:workshops@PTCorp.com), or call us at +1-760-201-0200 to discuss workshop details and receive a price quote.

# WORKSHOP MENU

All PivotPoint workshops include both structured presentations and interactive hands-on work sessions to reinforce learning principles and best practices. In addition, all workshops can be customized to address special project or team requirements.

- **3 day workshop** includes: *SysML – Basic* and *SysML – Intermediate*, and one of the following: *SysML – Advanced* or *SysML – Basic Modeling Tool*.
- **4 day workshop** includes: *SysML – Basic* and *SysML – Intermediate*, and two of the following learning modules: *SysML – Advanced*, *SysML – Basic Modeling Tool*, *SysML – Project Practicum*.
- **5 day workshop** includes: *SysML – Basic*, *SysML – Intermediate*, *SysML – Advanced*, *SysML – Basic Modeling Tool*, and *SysML – Project Practicum*.

<p style="text-align: center;"><b>SYSML – BASIC</b> [Module# LS101]</p> <p><b>Introduction</b></p> <ul style="list-style-type: none"> <li>• Model-Based Engineering &amp; Model-Based System Engineering</li> <li>• Basic Concepts</li> <li>• Principles and best practices</li> </ul> <p><b>SysML Quick Tour</b></p> <ul style="list-style-type: none"> <li>• Language overview</li> <li>• Diagram walkthrough</li> </ul> <p><b>Diagram Techniques</b></p> <ul style="list-style-type: none"> <li>• Use Case</li> <li>• Requirement</li> <li>• Activity</li> <li>• Block Definition</li> </ul> <p><b>Lifecycle Phases</b></p> <ul style="list-style-type: none"> <li>• Requirements</li> <li>• Analysis</li> </ul>	<p style="text-align: center;"><b>Goals</b></p> <ul style="list-style-type: none"> <li>• Learn about the advantages of a Model-Based Engineering approach to Systems Engineering</li> <li>• Understand the basic concepts and principles for modeling complex systems with SysML</li> <li>• Learn how to apply basic SysML diagram techniques</li> <li>• Learn how to specify a correct, complete, clear, concise, and consistent model</li> </ul>
<p style="text-align: center;"><b>SYSML – INTERMEDIATE</b> [Module# LS102]</p> <p><b>Topics</b></p> <ul style="list-style-type: none"> <li>• Model verification and validation</li> <li>• Model integrity guidelines</li> <li>• Model metrics</li> <li>• Cost/performance trade studies</li> <li>• Interface-based design</li> </ul> <p><b>Diagram Techniques</b></p> <ul style="list-style-type: none"> <li>• Internal Block</li> <li>• Sequence</li> <li>• State Machine</li> <li>• Parametric</li> <li>• Package</li> <li>• Allocation tables</li> </ul> <p><b>Lifecycle Phases</b></p> <ul style="list-style-type: none"> <li>• Design</li> <li>• Construction</li> <li>• Testing</li> </ul>	<p style="text-align: center;"><b>Goals</b></p> <ul style="list-style-type: none"> <li>• Learn how to apply SysML to the full System Development Life Cycle (SDLC)</li> <li>• Understand how to make your models more scalable</li> <li>• Learn how to improve the integrity and quality of your models</li> <li>• Learn how to verify and validate your models</li> </ul>

<p style="text-align: center;"><b>SysML – ADVANCED</b> [Module# LS103]</p> <p><b>SysML Review</b> <i>[If SysML refresher required]</i></p> <p><b>Topics</b></p> <ul style="list-style-type: none"> <li>• Recursive design</li> <li>• Advanced structural modeling techniques</li> <li>• Advanced behavioral modeling techniques</li> <li>• Analysis/design/architecture patterns</li> <li>• Advanced cost/performance trade studies</li> <li>• Model simulation and execution</li> <li>• Customizing SysML for domains and platforms</li> <li>• Model-based process selection and customization</li> <li>• Modeling tool selection and customization</li> </ul>	<p style="text-align: center;"><b>Goals</b></p> <ul style="list-style-type: none"> <li>• Learn advanced SysML modeling techniques to refine structural and behavioral models</li> <li>• Understand how to define and apply patterns for reuse</li> <li>• Learn how models can drive simulations and generate executable code</li> <li>• Understand how to customize SysML for your work domain</li> <li>• Learn how to select and customize model-based processes and tools</li> </ul>
<p style="text-align: center;"><b>SysML – BASIC MODELING TOOL: OPTIONAL</b> [Module# LS111]</p> <p><i>[All Model-Based Engineering workshops are based on tool-independent principles and best practices. If you have already chosen a SysML modeling tool, we can integrate optional tool training into your workshop. If you have not, we can help you select one that best meets your project and team needs. For a list of workshops customized for popular visual modeling tools see the Training page of the PivotPoint web.]</i></p> <p><b>Topics</b></p> <ul style="list-style-type: none"> <li>• Projects and diagrams</li> <li>• Generating documentation</li> <li>• Importing/exporting models</li> <li>• Requirements verification</li> <li>• Model validation and metrics</li> <li>• Model simulation/execution</li> </ul> <p><b>Diagram Techniques</b></p> <ul style="list-style-type: none"> <li>• Use Case</li> <li>• Requirement</li> <li>• Activity</li> <li>• Block Definition</li> <li>• Internal Block</li> <li>• Sequence</li> <li>• State Machine</li> <li>• Parametric</li> <li>• Package</li> <li>• Allocation tables</li> </ul>	<p style="text-align: center;"><b>Goals</b></p> <ul style="list-style-type: none"> <li>• Gain familiarity with the user interface and basic features of selected SysML modeling tool</li> <li>• Learn how to model most common SysML diagram types using selected modeling tool</li> <li>• Understand the strengths and weaknesses of selected modeling tool</li> <li>• Assess SysML and XMI standards compliance for selected modeling tool</li> </ul>
<p style="text-align: center;"><b>SysML – PROJECT PRACTICUM</b> [Workshop# LS121]</p> <p>The project practicum provides an opportunity to apply SysML modeling principles and best practices to solve project modeling problems in a creative and supervised workshop environment. The practicum can be used to facilitate:</p> <ul style="list-style-type: none"> <li>• SysML model peer reviews</li> <li>• SysML model revisions and extreme makeovers</li> </ul> <p>Students can identify project modeling problems in advance, or Instructor will work with students to identify them.</p>	<p style="text-align: center;"><b>Goals</b></p> <ul style="list-style-type: none"> <li>• Identify the SysML modeling principles and best practices that are most important to your team and your project</li> <li>• Apply SysML modeling techniques to project problems that you choose</li> </ul>