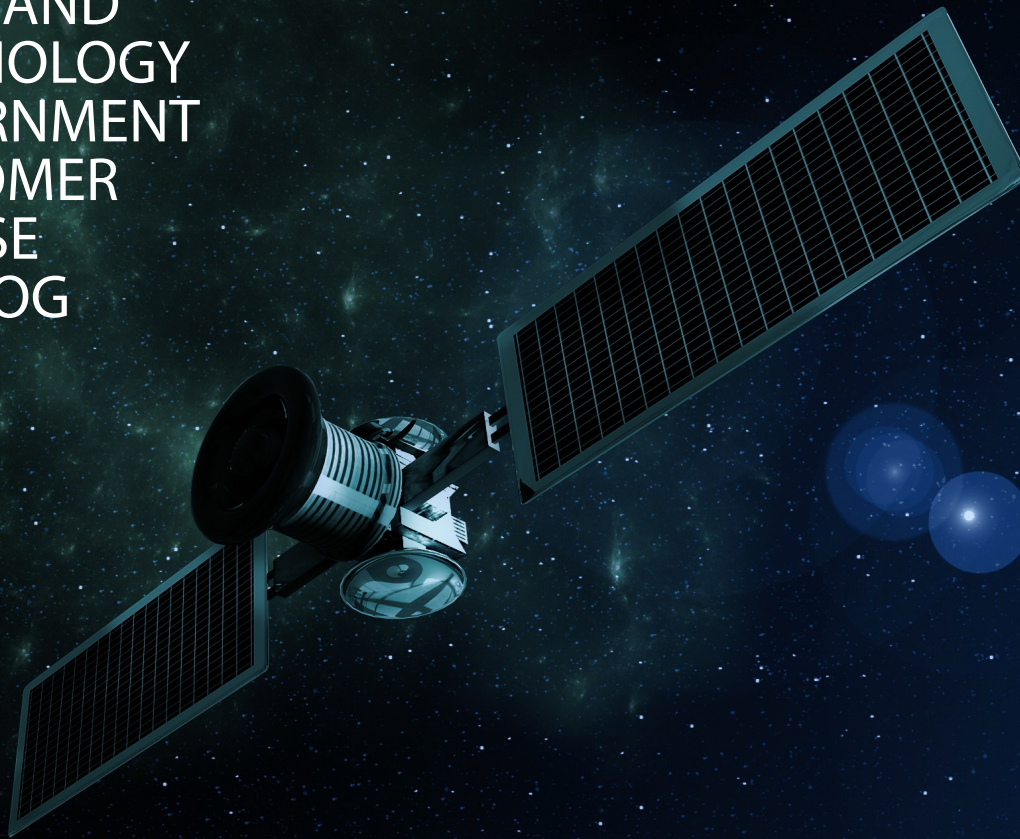


SPACE AND
TECHNOLOGY
GOVERNMENT
CUSTOMER
COURSE
CATALOG





The Aerospace Corporation is committed to nurturing the next generation of scientists and engineers by sharing the knowledge of our experts. A major way we do this is through Aerospace University, which offers a wide range of courses taught by our experts to our employees. This knowledge sharing also extends to our customers.

We encourage you to browse this catalog to learn more about the courses and curriculum offered with a purpose.

Aerospace University

ELIGIBILITY GUIDELINES

Aerospace government customers may attend select Aerospace University courses within our technical curriculum on a space-available basis. Customers should consult their Aerospace counterpart to determine eligibility and begin the enrollment process.

PROGRAMS

Aerospace University maintains a diverse curriculum in the Space and Technology category. Courses are aligned under one or more of the following subjects.



Aerospace Overviews broadly introduce areas specific to Aerospace, the domain of space, space missions, systems engineering, and acquisition topics, providing an overview of the workings and management of space systems. Content and resources at this level are especially beneficial to newcomers -- those with little or no background in space systems.



Digital Applications and Practices covers topics that support the development of digital capabilities and other areas related to digital operation such as machine learning/artificial intelligence, agile development, and data visualization.



Operating in Space encompasses topics related to space itself. The space environment and astrodynamics may be obvious, but communicating with Spacecraft is equally universal, as is the protection of space systems.



Space Systems and Spacecraft tackles topics pertaining to space vehicles, spacecraft, as well as the systems required to get them into space. Content in this area are for those who are interested in learning about specific systems and technologies, including the functions that maintain them.



Systems Engineering is a broad subject area that encompasses space system design, engineering, architecture, and other disciplines related to the work of Aerospace. Content in this category are intended for those who need to look across several technologies, going into some depth without being technology specific.

COURSES

Courses are offered in person or virtually via Skype, Microsoft Teams, or ZoomGov. Log in information and course materials are provided following enrollment in a course.

The most up to date schedule of course offerings can be found in the TLC. Contact your Aerospace counterpart in order to determine eligibility and for access to the TLC.

AEROSPACE OVERVIEWS

S3200 Space 101.....	07
T7240 Space Systems Overview	07

DIGITAL APPLICATIONS AND PRACTICES

AGILE110 Agile Development Methodology: Program Management Perspective Part I.....	07
AGILE120 Agile Development Methodology: Program Management Perspective Part II.....	07
AGILE101 Agile Software Development Overview.....	07
S4485 Cloud Computing Overview	08
S8010 Machine Learning Overview	08
T4287 Reducing the Software Risk in Space System Software	08
C2316 SOAP Analysis Applications	08
C2317 SOAP Geospatial Applications	08
C2315 SOAP Introduction.....	08
C2318 SOAP RF Applications (Advanced)	09
T2085 Trusted AI	09

OPERATING IN SPACE

T4286 Advanced Cyber Assessments	10
S4950 C2 in the Space Warfighting Domain	10
T4270 Cyber Top Gun: Enhancing Space Mission Resilience	10
T2045 Digital Radio Communication Overview	10
T4275 Mitigating Cyber Threats for Space Systems using Defense in Depth	10
T4288 Reverse Engineering for Hardware and Software Systems.....	11
S4920 Space Domain Awareness Overview	11
S4701 Space Policy Overview	11
S4705 Space Policy: International Cooperation and Competition.....	11
S4905 Space Protection Awareness Fundamental Series [classified].....	11
T4289 Understanding Risk Management Framework (RMF) Controls	12
T4271 Using Cyber Ranges to Strengthen Defensive Cyber Operations.....	12

SPACE SYSTEMS AND SPACECRAFT

S4215 Global Positioning System (GPS) Introduction.....	13
S4220 GPS Intermediate.....	13
S4015 Ground Systems Overview	13

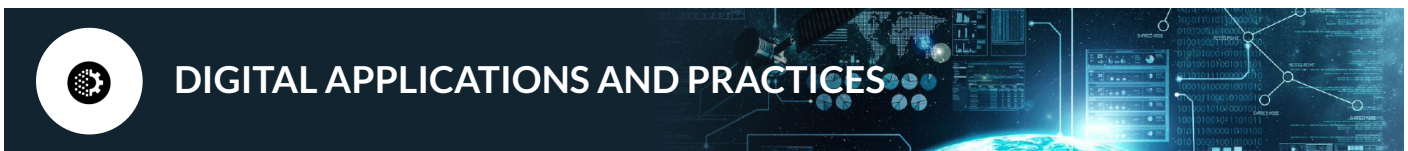
COURSES
CONTINUED

SPACE SYSTEMS AND SPACECRAFT CONT.	S4150 Launch Systems Introduction	13
	T7550 Spacecraft Propulsion Overview	13
<hr/>		
SYSTEMS ENGINEERING	S4626 Architecture Design & Evaluation	14
	S4621 Architecture Frameworks and Modeling: Overview	14
	S4623 Architecture Frameworks and Modeling: Using Models and Views	14
	S4624 Architecture Processes: Overview	14
	S2101 Assembly, Integration, and Testing (AI&T) Overview	14
	S4560 Enterprise Planning and Portfolio Analysis Overview	15
	S5020 MBSE: Learning SysML	15
	S5010 Model Based Systems Engineering (MBSE) Overview	15
	T7500 Systems Analysis Overview	15
	S4575 Systems Engineering Overview	15
	S4600 The Art and Science of Systems Architecting	15

[Back to Table of Contents](#)


AEROSPACE OVERVIEWS

Course ID	Title	Description
S3200	Space 101	Space 101 provides a high-level overview of operating in space. It is designed for anyone who is new to working in the space sector and does not require prior knowledge of science technology.
T7240	Space Systems Overview	Space Systems Overview offers a basic introduction to the primary elements of space systems. This course is designed for those new to Aerospace, new to space, or unfamiliar with space systems.

[Back to Table of Contents](#)


DIGITAL APPLICATIONS AND PRACTICES

Course ID	Title	Description
AGILE110	Agile Development Methodology: Program Management Perspective Part I	Agile Development Methodology: Program Management Perspective Part I is for anyone working with programs using agile methodology. It provides attendees with a rapid foundation in the principles, values, techniques, roles, ceremonies, and artifacts of Agile and Scrum.
AGILE120	Agile Development Methodology: Program Management Perspective Part II	Agile Development Methodology: Program Management Perspective Part II is designed to provide attendees with an Agile foundation in software architecture, requirements, design, test, and DevOps.
AGILE101	Agile Software Development Overview	Agile Software Development Overview is for anyone interested in learning about the fundamentals of working in an agile software development environment. It introduces key concepts and terms related to agile development methodology and eases the transition to an agile way of thinking by comparing these new ideas to familiar development processes, artifacts, and milestones traditionally associated with government programs.



DIGITAL APPLICATIONS AND PRACTICES (cont.)

Course ID	Title	Description
S4485	Cloud Computing Overview	Cloud Computing Overview reviews the basic concepts and terminology for cloud computing to get everybody "on the same page". It is for anyone who is interested in discovering the basics of cloud computing and will benefit those looking for an introduction to the topic.
S8010	Machine Learning Overview	Machine Learning Overview provides a basic understanding of machine learning and the machine learning process. This course is not intended to be a deep dive into the foundational mathematics upon which the algorithms are built, rather an overview of what different machine learning algorithms do and in what situations they should be applied.
T4287	Reducing the Software Risk in Space System Software	Reducing the Software Risk in Space System Software focuses more on the technical aspects of software assurance and less on policy. It covers various development methodologies (traditional and DevSecOps (Development Security Operations)). Students will learn an approach to securing ground software within the context of federal information systems. Federal requirements, coding standards, tool usage will be discussed as part of the solution to securing software.
C2316	SOAP Analysis Applications	SOAP Analysis Applications is geared toward orbital analysts interested in learning more about the Satellite Orbit Analysis Program (SOAP). This course builds upon the knowledge and skills learned in the C2315 SOAP Introduction course. Analysts will gain a deeper understanding of the inner-workings of SOAP which will help them develop more sophisticated scenarios.
C2317	SOAP Geospatial Applications	SOAP Geospatial Applications is geared toward orbital analysts interested in learning more about the Satellite Orbit Analysis Program (SOAP). In SOAP Geospatial Applications, participants will learn efficient ways of working with many platforms (satellites). Participants will then build a ground-based tactical scenario involving the GPS constellation, advanced analyses, medium-resolution ground terrain/imagery, a UAV, a ballistic missile, and a fictional enemy ammunitions depot. C2315 SOAP Introduction is recommended prior to this course.
C2315	SOAP Introduction	SOAP Introduction is for anyone with an interest in orbital simulation and modeling. It is a hands-on introductory course that will familiarize students with the Satellite Orbit Analysis Program (SOAP) user-interface and guide them through the process of creating basic satellite orbital scenarios.



DIGITAL APPLICATIONS AND PRACTICES (cont.)

Course ID	Title	Description
C2318	SOAP RF Applications (Advanced)	In the SOAP RF Applications Course, participants will leverage the advanced capabilities of the Satellite Orbit Analysis Program (SOAP) to import rocket trajectory data, satellite ground imagery, customized antenna gain pattern data, Radio Frequency (RF) transmitter and receiver objects, and 3D CAD models to build a fictional rocket launch and command destruct visualization.
T2085	Trusted AI	Trusted AI is intended for decision makers, program managers, chief engineers, systems architects, analysts, Artificial Intelligence (AI) scientists and practitioners from defense-related businesses interested in the application and ramifications of trusted autonomous systems. This course aims to provide a foundation for building trust in autonomous systems. Elements of autonomous systems are defined, and in that context, the perception of trust is explored.



OPERATING IN SPACE

Course ID	Title	Description
T4286	Advanced Cyber Assessments	Participants of Advanced Cyber Assessments will leave with an understanding of key Risk Management Framework (RMF) implementation errors, can use this understanding to explain to their customers how those errors undermine the ability to manage cyber risk, and how the C-STARR methodology can mitigate these common shortcomings. Participants will understand that once the organization begins to measure information system sources of risk in a semi-quantitative manner, then aggregates those risk measurements in a logical and intuitive manner, those organizations will finally have the information necessary to begin to effectively manage cybersecurity risk.
S4950	C2 in the Space Warfighting Domain	Command and control (C2) of forces and the systems that support them is the lifeblood of military operations. In this new era where space has become a recognized warfighting domain, there are many questions surrounding the requisite actions required to orchestrate such operations. This course will not only explore these questions but will also posit candidate answers covering such topics as C2 basics including the targeting cycle, Joint and Combined military operations, global versus theater needs, building C2 for space, levels of decision making, challenges of C2 in warfighting, and current and future trends.
T4270	Cyber Top Gun: Enhancing Space Mission Resilience	Participants of A Cyber Top Gun: Enhancing Space Mission Resilience will leave with the ability to discuss the capabilities and benefits of using cyber ranges, to recognize potential cyber vulnerabilities in their systems using non-intrusive methods and techniques.
T2045	Digital Radio Communication Overview	Digital Radio Communication Overview is for anyone interested in further understanding the basics of digital radio communication and is the foundation for other programs on communication systems. Selected examples emphasize satellite communication, but the principles apply equally to terrestrial wireless communication.
T4275	Mitigating Cyber Threats for Space Systems using Defense in Depth	Participants in Space Cyber Series – Mitigating Cyber Threats for Space Systems using Defense in Depth will gain knowledge of cybersecurity threat vectors and counter measures. They will be better positioned to provide guidance to their customers on meeting regulatory security compliance in addition to designing in security using defense in depth.



OPERATING IN SPACE (cont.)

Course ID	Title	Description
T4288	Reverse Engineering for Hardware and Software Systems	Reverse Engineering for Hardware and Software Systems will help participants become familiar with the technical tools and methods used to attack systems when there are no source code or schematics available. This knowledge helps to thwart would-be attackers by helping to recognize potential attack vectors as the system is developed. Participants in this course will leave with deep understanding of technical tools and techniques used in the hardware and software reverse-engineering process.
S4920	Space Domain Awareness Overview	Space Domain Awareness Overview provides an overview of situational awareness of space, officially known as Space Domain Awareness (SDA), with a focus on space protection and warfighting. The material is presented using the doctrinal categories of Detect/Track/Identification (DTI), Characterization (CH), Threat Warning and Assessment (TWA), and Data Integration and Exploitation (DIE) to explain SDA as a mission area and covers each topic in relation to the others. This material is relevant to anyone working in the space industry today as space is being tightly woven into the larger multi-domain fight.
S4701	Space Policy Overview	Space Policy Overview explains relevant decision-making processes in the context of historical and current space policy. Technical personnel, from entry level through top managers, will benefit from this class by gaining the ability to anticipate changes brought about by policy actions and engage effectively with policy-makers when needed.
S4705	Space Policy: International Cooperation and Competition	Space Policy: International Cooperation and Competition aims to help participants understand the implications of international cooperation, competition, and law as applied to space policy.
S4905	Space Protection Awareness Fundamentals Series [classified]	Space Protection Awareness Fundamentals Series [classified] addresses a wide range of threats to space systems, from radio-frequency jamming to co-orbital antisatellite (ASAT) attacks. Each type of threat is examined in detail to present the fundamental physics and technology, a brief history, considerations regarding use and deployment, and potential countermeasures. This seminar is not a survey of current intelligence regarding threats to space systems; rather, it is a foundational presentation of the technology and underlying physics of these potential threats.



OPERATING IN SPACE (cont.)

Course ID	Title	Description
T4289	Understanding Risk Management Framework (RMF) Controls	Understanding Risk Management Framework (RMF) Controls focuses on the NIST SP 800-53 Revision 5 (National Institute of Standards and Technology Special Publication Titled: Security and Privacy Controls for Information Systems and Organizations) control catalog. It will start out by discussing what the catalog is, and the basic notion and structure of controls. It will discuss the differences between Revision 4 and Revision 5. It will then explore each of the 19 control families, the basic controls therein, and some of the more noticeable enhancements.
T4271	Using Cyber Ranges to Strengthen Defensive Cyber Operations	Using Cyber Ranges to Strengthen Defensive Cyber Operations will help participants become familiar with advanced cyber tools to help identify / reduce vulnerabilities and test fly concepts to enhance Space Mission System resilience. This will help identify concepts to “fight through” the inevitable cyber-attacks and cyber war.



SPACE SYSTEMS AND SPACECRAFT



Course ID	Title	Description
S4215	Global Position System (GPS) Introduction	This course is geared toward government customers who need basic information about the acquisition and operation of the GPS.
S4220	GPS Intermediate	GPS Intermediate is designed for those who want detailed insight into GPS at the program, system, and subsystem levels. Note certain portions of this course may require that participants have a secret clearance.
S4015	Ground Systems Overview	Ground Systems Overview is intended for those who seek to understand satellite ground system design, development, acquisition, and operations—and the vital roles played by Aerospace. This course provides an overview of satellite ground systems with the intention of introducing the key vocabulary and concepts necessary to discuss ground systems and understand their relationship to other elements of space systems and mission operations.
S4150	Launch Systems Introduction	Launch Systems Introduction is geared toward technical staff needing a broad overview of space launch and launch systems. This course introduces launch vehicles and how they work from both technical and operational perspectives.
T7550	Spacecraft Propulsion Overview	Spacecraft Propulsion Overview provides an introduction to spacecraft propulsion. The course covers various propulsion system types, along with thruster details, relevant testing, mission assurance documents, and examples of notable anomalies.



SYSTEMS ENGINEERING



Course ID	Title	Description
S4626	Architecture Design & Evaluation	Architecture Design & Evaluation is intended for systems engineers, program managers, and analysts that support architecture studies. This course provides instruction on the Architecture Design and Evaluation process. It teaches students how to apply a structured process to define and perform architecture-level trade studies.
S4621	Architecture Frameworks and Modeling: Overview	Architecture Frameworks and Modeling: Overview is an introduction to architecture frameworks and addresses what is meant by an architecture, and answer the question, "What are architecture frameworks?" Examples of architecture frameworks will be provided that are relevant to the Aerospace mission. The overview will also discuss Department of Defense Architecture Framework (DoDAF) 2.02, the current and official current version for the DoDAF.
S4623	Architecture Frameworks and Modeling: Using Models and Views	Architecture Frameworks and Modeling: Using Models and Views is intended for practitioners as well as staff wishing to further explore this subject area. In this course, participants will explore the Department of Defense Architecture Framework (DoDAF) 2.02 and includes exercises where participants will have the opportunity to interpret architecture diagrams.
S4624	Architecture Processes: Overview	Architecture Processes: Overview provides a top-level overview of systems architecture processes as defined in ISO 42020 standard. It is a recommended prior to follow-on programs in Aerospace University's architecture curriculum. This short program discusses architecture conceptualization, architecture evaluation, architecture elaboration, and architecture management, government, and enablement.
S2101	Assembly, Integration, and Testing (AI&T) Overview	Assembly, Integration, and Testing (AI&T) Overview is the first module in a training series that will equip engineering personnel with the knowledge needed to take a hardware design from a paper design to flight readiness. In this module You will explore areas that support AI&T activities including planning, ground support equipment, facilities and an introduction to aid in developing a keen eye to look for opportunities to support schedule whilst ensuring a viable, and verified, product.



SYSTEMS ENGINEERING (CONT.)



Course ID	Title	Description
S4560	Enterprise Planning and Portfolio Analysis Overview	Enterprise Planning and Portfolio Analysis is for those who would like an understanding of how Aerospace supports our customers utilizing Enterprise Systems Engineering frameworks to include support to agency budget build processes, capability road-mapping, and other acquisition strategy activities. This class describes a framework and several of the tools Aerospace utilizes to support our customers across the space enterprise when doing Enterprise Planning and Portfolio Analysis activities, including the interaction between enterprise architectures, program budgets and schedules, and programmatic risks and opportunities.
S5020	MBSE: Learning SysML	MBSE: Learning SysML provides a theoretical introduction to Model Based Systems Engineering (MBSE) and the Systems Modelling Language (SysML). During the course, participants will get practical experience using a SysML tool to complete hands-on exercises. Non-Aerospace personnel must have their own working copy of Cameo Systems Modeler installed on their computer.
S5010	Model Based Systems Engineering (MBSE) Overview	Model Based Systems Engineering (MBSE) Overview is for those interested in learning how to leverage the use of model-based techniques and tools in systems engineering practice. This course is intended to introduce fundamental concepts of MBSE and provide examples to illustrate the use of model-based techniques and tools to address systems engineering challenges in practice.
T7500	Systems Analysis Overview	Systems Analysis Overview provides an overview of performance analysis, cost analysis, and risk analysis. It will focus on why these analyses are performed, what kinds of information can be generated, and how this information can be used in decision-making. The capabilities and strengths as well as the shortcomings and limitations of these analyses will also be discussed.
S4575	Systems Engineering Overview	Systems Engineering Overview introduces the standard systems lifecycle processes and a variety of methods and approaches used to implement those processes. It provides prerequisite knowledge for more advanced and specific topics related to Systems Engineering such as Enterprise Systems Engineering, Model Based Systems Engineering, and Systems Architecture.
S4600	The Art and Science of Systems Architecting	The Art and Science of Systems Architecting will benefit anyone involved in systems architecting. This course presents the core concepts of systems architecting. It lays out the models and views used in architecting and specifically examines applications to distributed systems of systems.

