

SLS DESCRIPTIONS: 2009

Mathematics – The Tools to Model the World

Department of Mathematical Sciences

The Department of Mathematics presents a multi-faceted workshop which is an introductory survey of several varied applications of mathematics. The course will begin with an introduction to vector functions, and subsequently demonstrate how these vector functions can be used to model a particle's trajectory. This portion will culminate with a hands-on experiment where these vector functions will be used to model a scaled artillery piece. The team that successfully uses vector functions to model the artillery piece and delivers the most accurate shot will win. The next portion of the workshop will focus on probability. Students will use fundamentals of probability and statistics towards examining games of chance. A prime example is the current hit show "Deal or No Deal." How can we use basic math skills to decide on the best course of action? The winner might one day be a multi-millionaire. Finally, the remaining time will be spent introducing the students to the study of Sabermetrics, "the search for objective knowledge about baseball." Our goal is for each student to gain an appreciation for the power of mathematics in problem solving.

Get to the Point – Leader and Leadership Lessons from West Point

Department of Behavioral Sciences and Leadership

What competitive advantage do 21st Century Warfighters have that give them an edge over similarly skilled soldiers? How can you become a better leader? How can you improve your leadership?

We invite you to attend powerful, thought-provoking, and memorable workshops designed to address these timely and compelling questions. From our distinguished Leadership and Management programs, we offer the exploration of leadership through games and simulations as we strive to understand the responsibility of leadership and the leader legacy that we will leave behind. From engineering psychology faculty specializing in network science, we offer a session on social networking and its critical leadership implications. Working in concert with the Center of Enhanced Performance, we offer a workshop on enhanced performance training at the Academy that you can apply today. From our psychology and sociology programs, we offer discussions on leader and leadership development while promoting greater self and cultural awareness.

Mock Congress and Public Policy Workshop

Department of Social Sciences

This workshop provides a hands-on approach to the complexities of the public policy-making process with a simulation of the United States Congress. Acting as Senators, students will draft legislation in Congressional Committees, debate bills proposed by the various committees, and vote on each piece of legislation raised on the Senate floor. Students will have the opportunity to debate the costs and benefits of legislation concerning foreign and domestic policy on a range of topics to possibly include: changing the voting and/or legal drinking age, reinstatement and expansion of the military draft to include domestic service, abolition of the Electoral College, and expansion of domestic oil drilling.

West Point and the Hudson Highlands in the American Revolution and Beyond

Department of History

This workshop examines the course of the American Revolution in the Hudson Highlands, with special emphasis on the key role West Point played in that struggle. The session features a discussion of the contending forces and strategies, exhibits of weapons and equipment used in warfare, and a walking tour of existing Revolutionary War fortifications at historic West Point. Also included is a visit to the West Point Cemetery to further emphasize West Point's critical role as the "Key to the Continent" during the American Revolution and ultimately as the United States Military Academy.

Chemistry and Life Science Workshop

Department of Chemistry and Life Science

Students will work as part of small groups or individually to perform basic laboratory experiments in chemistry and biology which will provide them with an introduction to some of the skills used to answer scientific questions. These experiments will be in various areas of biology, general chemistry, and chemical engineering and each will highlight a concept or type of work typical of the given discipline. These work groups will allow the students to see all the major areas within the department and discover, through hands on experience a better knowledge of both chemistry and biology. Students will acquire basic laboratory skills and also use observation, analytical reasoning, and critical thinking to solve scientific problems. Students will also be introduced to various academic opportunities available in the Chemistry and Life Science Department.

(**NOTE: STUDENTS ATTENDING THE WORKSHOP WILL WORK IN A CHEMICAL LABORATORY ENVIRONMENT. AS SUCH, STUDENTS WILL NOT WEAR CONTACT LENSES DURING THIS WORKSHOP. STUDENTS MUST BRING A PAIR OF REGULAR EYEGLASSES FOR USE WHILE IN THE LAB. SANDALS ARE NOT PERMITTED IN THE LAB. PROTECTIVE EYEWEAR AND LAB COATS ARE PROVIDED.

Systems Engineering and Engineering Management Today

Department of Systems Engineering

The Department of Systems Engineering offers a two-part workshop that challenges innovative students to explore complex engineering problems from within the systems engineering/operations research program and the engineering management program.

a. The morning session focuses on introducing students to the concepts of Systems Engineering and how to take a “Systems Approach” toward problem solving. Students will be given the opportunity to apply Systems Engineering techniques to analyze a real-world problem relevant to their lives. This session will also introduce students to the Engineering Management Program through a factory distribution board game. Students will form 2 opposing teams and compete against each other to minimize distribution costs. This exercise introduces students to contemporary practice in manufacturing and distribution supply chain management, which is a driving force in the modern global economy. Students play roles across the supply chain and develop an appreciation for the importance of minimizing costs through information sharing and optimal ordering and inventory policies.

b. The afternoon session focuses on modeling, simulation, and building a prototype to solve an engineering problem. Students get hands on experience with several simulations including combat simulations and industrial simulations. Students will have the opportunity for hands on experience in virtual (training) and constructive (analytical) combat simulations, and tour the department’s CAVE (Computer Aided Virtual Environment). The afternoon session culminates with a robotic system design competition using LEGO robots.

Our hands on program exposes students to a broad range of techniques that are at the cutting edge of architecting, building, and operating the complex systems that are changing our world.

Electrical Engineering Digital Integrated Circuit Electronics Workshop

Department of Electrical Engineering and Computer Science

Electrical Engineers design, build, and test the electrical, electronic, and computer systems and devices that are so prevalent in our society today. The work of electrical engineers has an impact on almost every area of our lives: how we work, how we play, how we communicate, how we travel, modern medicine, and our national defense. If you have ever wondered what makes electronic “things” work, this workshop is for you! This workshop features the construction of a digital clock. Basic digital logic elements will be discussed and demonstrated. Elementary electronic construction techniques, including soldering, will be shown. Students will then build their own clocks under the guidance of an instructor. Demonstrations of microprocessor electronics (microcomputers), robotics, photonics engineering, and other areas of electrical engineering will be presented as time permits. Students take their completed clocks home at the conclusion of the workshop.

The Quest Narrative from King Arthur to Harry Potter

Department of English

Quest narratives are tales filled with adventure, battle, romance, and symbolism. But these stories aren't just action-packed thrillers. Epic stories of the quest reveal much to us about what humans value—what, in essence, is worth searching for? What motivates both Sir Lancelot and Indiana Jones to quest for the Holy Grail? What characteristics enable heroes like Sir Gawain to succeed? What do characters like Harry Potter and Frodo (*Lord of the Rings*) have in common? By exploring the moral virtues that protect and enable these questing characters—Frodo's purity, Sir Gawain's courage, and the enduring power of sacrifice in Harry Potter, for example—we can discover more about the moral and physical characteristics that different ages and cultures valued, while also comparing the vast differences between the objects of each quest. The symbolism attached to both the Holy Grail and Tolkien's Ring of Power, for example, are rooted in conceptualizations of power that have markedly different places of origin and practical application. Likewise, medieval heroes like the Knights of the Round Table and twenty-first century heroes like Lyra Silvertongue (*The Golden Compass*) share some fascinating similarities, as well as profound differences. We will read short excerpts from a variety of quest narratives and also watch the quest as it is crafted for film. Students will also engage in their own "quest" with classmates that will provide an opportunity to leave the classroom and test their own knowledge of quests, characters, and the West Point campus.

Computer and Information Technology Applications Workshop

Department of Electrical Engineering and Computer Science

The Computer and Information Technology Applications Workshop uses a hands-on approach to introduce students to graphics animation, networking with cell phones, and information security (as well hacking).

Using shareware and freeware products, each student develops a personal animation effect by morphing their image with a historically famous leaders of their choosing (students will be given a copy of their work to take home). Using a one-stop picture morphing software program, students may add unique and exciting visual effects to screen savers, web graphics, music videos, movies, presentations, email, etc., just like a professional animation director does to create amazing images and animations. Students also learn about Internet addressing schemes, network connections, and programming of graphical user interfaces on the iPhone/iPod Touch. In teams of 3-4, they will write a custom function that directs an iPod Touch to move and fire a sequence of three remotely located toy missiles at prepositioned targets in the classroom. A significant portion of the workshop is spent in the Academy's Information Warfare Analysis and Research (IWAR) lab where students learn about computer security issues. The lab is the premiere undergraduate information assurance teaching facility in the country. Members of the department provide demonstrations of hacking software in an environment segregated from the USMA network and students are exposed to security threats, such as viruses, Trojan Horses, worms, and denial-of-service attacks. Students will have the opportunity to exploit current computer vulnerabilities and then implement defenses they have learned to thwart those exploits. Ethical and legal issues are specifically addressed throughout.

Mock Trial Workshop

Department of Law

This workshop introduces students to trial procedures and illustrates the importance of the requirement that guilt be proved beyond a reasonable doubt. The centerpiece of this workshop is a mock criminal trial in which students play the roles of prosecutors, defense attorneys, defendant, witnesses, and jurors. Students will interview witnesses, prepare trial strategies, and actually conduct the trial. Military and civilian attorneys will act as advisors and judge and will assist the students in preparation and at the trial. At the end of the trial, student jurors will vote to determine whether the defendant is guilty or not guilty.

Foreign Language Workshop

Department of Foreign Languages

The Department of Foreign Languages will offer a computer-assisted language-learning workshop featuring Arabic and Chinese, two of the seven languages (French, German, Portuguese, Spanish, Arabic, Russian and Chinese) taught at West Point. The sessions will include basic language instruction with an opportunity for students to use interactive video, computer-assisted language exercises, and the language laboratory. The sessions will emphasize oral communication in the featured language and will include presentations of the cultural aspects of those countries where the language is spoken.

Civil and Mechanical Engineering Design-Build Workshop

Department of Civil & Mechanical Engineering

Engineering is all about using the design process to solve problems. In this two-part workshop you will participate in this process, designing and building your own solutions.

- a. Mechanical. Students will be presented with a real-world challenge and have the opportunity to design, build and test their solution using Lego motors and pieces. The challenge simulates delivering much-needed supplies to soldiers stranded on a hillside. The students will learn engineering fundamentals about torque, power and gear trains and be able to directly apply those concepts to the design. This workshop also combines an overview of what Mechanical Engineering is and what type of problems Mechanical Engineers can be expected to solve.
- b. Civil. After a discussion of the civil engineers' role in planning, designing, building, operating and maintaining the nation's infrastructure, students will use computer modeling and simulation tools to design, build and test a truss bridge. Students will also design and build a bridge out of K-nex components, and load the bridge to failure, in a bridge design competition.

Discoveries in Geospatial Information Sciences and Environmental Engineering Sciences

Department of Geography and Environmental Engineering

This workshop is divided into two phases. The first phase of this workshop focuses on the rapidly growing discipline of Geospatial Information Science (GISc). Have you ever wondered how GoogleEarth and MapQuest works? Do you enjoy computer gaming, simulations and high-tech gadgets? If so, you'll love this workshop. See how the military uses and translates these concepts into real world and military applications. Students will be exposed to global positioning systems (GPS), real-time mapping solutions, high resolution satellite imagery, geographic information systems (GIS), fly-through simulations and terrain modeling. The second phase of this workshop focuses on the fascinating field of environmental engineering sciences. Get wet solving a mystery in our teaching labs while making discoveries in the environmental engineering sciences discipline! More than just finding the hidden environmental problem; design and construct an engineered solution to protect human health from such a problem. Along the way, investigators will debate environmental issues and formulate a stance on just how much protecting our planet is worth.

G – Physics, Superconductivity, Electromagnetism, and Nuclear Engineering Workshop

Department of Physics

The physics, superconductivity, and electromagnetism half of this workshop will begin with a superconductivity laboratory where you will use liquid nitrogen to help levitate a small magnet over a sample of superconducting material. You will then apply electromagnetic theory to the operation of electric motors. After that discussion, you will build small motors. At the conclusion of this part of the workshop, you will be provided the opportunity to fire a potato gun, fire a vacuum gun, and will learn how you can build your own hovercraft. In the nuclear engineering half of the workshop, you will learn how nuclear power can be used to help meet the world's growing energy needs and how nuclear power is essential for developing economy of the future while limiting the effects of global climate change. Next, you will visit our nuclear science laboratory including the sub-critical facility. This session will conclude with a hands-on nuclear science laboratory in which you will use two different radiation detectors to calculate the effectiveness of various radiation-shielding materials and identify an unknown radioactive sample.

Warfighting Simulations

Department of Military Instruction

This workshop introduces students to the rapidly expanding world of combat simulations and their uses in training, testing, and the evaluation of new tactics and plans. In the workshop, the students are divided into squads. Each squad works to come up with a plan to accomplish a tactical mission. Then, using a ground combat computer simulation system, the squads go head-to-head. Using small unit tactics, each student gains a unique understanding of how a US Army squad is organized, trained, and equipped to fight and win. Military officers coach and assist students through the entire process. The simulation used in the laboratory is America's Army. Students will also have the opportunity to experience the Engagement Skills Trainer 2000. EST 2000 is the Army standard for teaching soldiers and cadets alike valuable marksmanship skills as well as how to operate their M16/M4. Students will be given an opportunity to participate in a collective battle drill to enhance their knowledge of military tactics and weapon capabilities.

"Leadership and Ethics"

Sponsored by the USMA Simon Center for the Professional Military Ethic -- facilitated by the Center for Leadership and Ethics (Dr. Len Marrella, Pres)

Most people agree with the wisdom of Heraclitus: "Our **character** is our *destiny*." Character is the sum of one's values, virtues, and moral qualities -- it is manifest in decisions and actions. Thus, people of character will seek to discover the truth, decide what is right, and demonstrate the ability, courage, and commitment to act accordingly. At USMA, our mission is to develop commissioned officers who are *Leaders of Character*. Clearly, such leaders must be **competent**, they must know and fulfill their obligations and duties with outstanding professional skill; and they must do so based on the ethical principles that frame the nation (as reflected in the Declaration of Independence and the Constitution). This workshop will focus on the importance of developing character as an integral component within the process that develops leaders. Course material is based on: In Search of Ethics, Conversations with Men and Woman of Character, by Dr. Len Marrella; The Leadership Challenge, by J.M. Kouzes & B. Posner; and the Ethical Fitness Seminar Program, developed by the *Institute for Global Ethics*. Students will: learn concepts and terms relating to ethics, values, and virtues; address ethical dilemmas; develop an "ethical code" to guide decision-making and actions; and discover the process for developing their own Character & Competence -- a life-long pursuit.