### VISUAL ARTS

http://krieger.jhu.edu/visualarts/

The Center for Visual Arts engages and challenges students in the study and practice of the visual arts to encourage innovative making and thinking, risk taking and creative problem solving that is applicable to research across disciplines.

Visual arts courses examine contemporary and historical perspectives in art while providing an inclusive environment where ideas are shared and acted upon.

Central to this mission of challenging students and advancing their knowledge and skills in the arts are classes that offer faculty led cross-disciplinary collaboration within diverse academic programs at JHU and the greater Baltimore community. CVA faculty are accomplished artists, photographers, designers, and illustrators.

Students can minor in art or take general elective classes from a diverse curriculum that includes drawing, painting, printmaking, digital photography, visual communication, fiber art and a range of special topics courses. Through Johns Hopkins’ cooperative programs with MICA (Maryland Institute College of Art) and other colleges in the Baltimore area, students can take courses not offered at the Center for Visual Arts.

The CVA hosts an annual fall faculty show to highlight the creative work of current faculty.

Each spring, the Johns Hopkins community is invited to attend an exhibition of the year's best work by CVA students. Additionally, a variety of temporary exhibits are hosted in the department throughout the year.

The CVA invites award winning artists to campus every semester to work with students and give a public presentation about their art practice. News and events can be found on our social media pages:

- [https://www.facebook.com/jhuvisualarts/](https://www.facebook.com/jhuvisualarts/)
- [https://www.instagram.com/explore/tags/jhuvisualarts/](https://www.instagram.com/explore/tags/jhuvisualarts/)

The photography, painting and drawing departments offer a summer study abroad program at Burren College of Art in Ballyvaughan, Ireland. More information can be found on the Study Abroad website (http://jhu-sa.terradotta.com/).

### Programs

- Visual Arts, Minor (https://e-catalogue.jhu.edu/arts-sciences/full-time-residential-programs/degree-programs/art-workshops/visual-arts-minor/)

For current course information and registration go to [https://sis.jhu.edu/classes/](https://sis.jhu.edu/classes/)

### Courses

**AS.371.126. Fiber Art and the String Revolution. 3 Credits.**
This course presents students with technical, historical and cultural understanding of the fiber medium. Students learn the basics of textile processes, including dyeing, felting, knitting, weaving, sewing, and lacemaking. Technical demonstrations and samples will be covered in class while students are encouraged to expand upon covered material through long-term personal projects. Technical demonstrations will be supported with slide lectures demonstrating the historical context of fiber processes and their contemporary applications. Attendance in 1st class is mandatory.

**AS.371.129. Botanical Painting in Watercolor and Gouache. 3 Credits.**
This introductory painting class is an exploration of the ways watercolor and designer gouache are used together to paint organic materials representationally. We’ll study the difference between botanical painting and illustration and trace how women specifically have shaped this genre of art through history. Students will learn techniques from both observation and invention and artwork will be assessed in weekly group critiques. Course includes demonstrations, short readings and a research paper about a botanical artist.

**AS.371.131. Foundation Drawing. 3 Credits.**
This course is designed as an introduction to the tools, techniques and concepts of basic drawing for students with little or no previous experience. Studio assignments focus on developing strong observation and rendering skills while experimenting with traditional and contemporary practices in drawing. Wet and dry media will be used. Attendance at 1st class is mandatory.

**AS.371.133. Oil Painting I. 3 Credits.**
This course is designed as an introduction to the tools, techniques and concepts of basic painting for the serious student with little or no previous experience. Studio assignments focus on developing strong observation and rendering skills focusing on issues of light, color and composition while experimenting with traditional and contemporary practices in painting. Lectures and a museum trip give students an art historical context in which to place their own discoveries as beginning painters. Oil paint will be used. Attendance at 1st class is mandatory.

**AS.371.147. Art of Architecture: Homewood, Baltimore and Beyond. 3 Credits.**
In this course, students will learn to design, draw, and see like an architect. A series of progressive design exercises will teach the practical capacities and habits of mind that lead not merely to competence but success and advancement in the field. We will look at what architecture has been, discuss what it is becoming, and explore both formal and narrative methodologies for design. The class will use the built environment of the city - and the Homewood campus - as a classroom and a site for interpretive drawing and creative design work. Essential in the architect’s education is the sketchbook, which functions not merely as a place to ‘store’ what has been witnessed, but a place to interpret and explore implications of design in the world, whether close to home or traveling in exotic locales.
AS.371.151. **Photoshop/Digital Darkroom. 3 Credits.**

Photoshop is not only the digital darkroom for processing images created with digital cameras; it is also a creative application for making original artwork. In this course, students use Photoshop software as a tool to produce images from a fine art perspective, working on projects that demand creative thinking while gaining technical expertise. Students will make archival prints, have regular critiques, and attend lectures on the history of the manipulated image and its place in culture. We will look at art movements which inspire digital artists, including 19th-century collage, dada, surrealism, and the zeitgeist of Hollywood films. Students must have a digital SLR camera. Prior knowledge of Photoshop is not required. Attendance at first class is mandatory. Approval for this course will be considered after enrollment on SIS; no need to email.

AS.371.152. **Introduction to Digital Photography. 3 Credits.**

In this course students are introduced to the technical and creative study of digital photography. Students will learn the basic operation of the DSLR camera while receiving instruction in Photoshop, Lightroom, Nik software, file handling and color editing processes. Through in-class demonstrations and in the field practice, students learn to use the camera’s manual settings to make accurate exposures. Lectures and discussions of historical and contemporary photographs will be introduced to give students guidance and inspiration for their own image making. The semester culminates with students creating a final portfolio of prints. Attendance in first class is mandatory.

AS.371.153. **Introduction to Visual Communication- Graphic Design. 3 Credits.**

The digital design course explores two-dimensional graphics as visual communication. Students will be introduced to basic design principles and elements, learn graphics tools used in the design industry, and develop and apply creative strategies to solve design problems in their everyday lives. This unique course will address the students’ direct needs through real-life design problems they face. Students will be asked to bring design challenges and tackle the issue both independently and collaboratively. Design challenges may include building print and web visual presentations, producing information brochure and posters, developing off and online portfolios, creating a resume to business cards. The course will offer both analog and digital design processes, graphics software tutorials and techniques, and basic introduction to design history, vocabulary and concepts.

AS.371.154. **Introduction to Watercolor. 3 Credits.**

Watercolor is simultaneously the most accessible of all painting media and the most misunderstood. This course provides experience and instruction in observational and expressive watercolor techniques, materials, concepts, and vocabulary. Topics to be reviewed include line, perspective, value, texture, composition, color, and pictorial space. There will be an introduction to contemporary practices in watercolor, as well as experimental and abstract exercises, collage, and conceptual work.

AS.371.155. **Introduction to Sculpture. 2 Credits.**

A studio course introducing students to sculptural concepts and methods. Emphasis is on the process of creating. Even the simplest materials can effectively activate space, convey meaning, and elicit emotion when used thoughtfully and imaginatively. Students will learn different methods including additive and reductive techniques, construction, modeling, and mold-making. No prerequisites except a willingness to experiment, make mistakes... and clean up when you are done. Approval in this course will be considered after enrollment in SIS. Attendance in 1st class is mandatory.

AS.371.156. **Black and White: Digital Darkroom. 3 Credits.**

In this digital photography course, students explore the beauty and drama of the black-and-white aesthetic. Students learn the elements of composition, style and content through discussions of historic and contemporary imagery. They gain proficiency in Photoshop, Lightroom, and Nik software. Projects enhance students’ artistic vision and include the Evocative Landscape, Surrealism, and a DADA collage. Students work on a final project of their choice. Digital SLRs are provided. Attendance at 1st class is mandatory. Camera experience is a plus but not a requirement. Approval for this course will be considered after enrollment on SIS.

AS.371.164. **Introduction to Printmaking. 2 Credits.**

Working with non-toxic/water based inks and both an engraving press and hand tools, students will explore several types of printmaking. Methods will include intaglio, collograph and both simple and multi-plate relief. As they develop their prints, students can then observe and exploit the strengths that each method has to offer. Drawing and Photoshop skills are helpful but not required.

AS.371.165. **Location Photography. 3 Credits.**

Working in the studio and in various locations, students will learn the fundamentals of lighting interiors and strategies for working in almost any environment. Field trips will include the National Aquarium, Evergreen Museum & Library, a Howard County horse farm, a Tiffany-designed church and a photo studio. Students will also concentrate on the fine art of printing in our digital lab. They will develop a final portfolio of 10 photographs which express a personal vision about a location of their choice. A basic knowledge of digital photography is helpful, but not required. Approval for this course will be considered after enrollment on SIS. First class is mandatory.

AS.371.166. **Landscape Photography. 3 Credits.**

Class begins: Wednesday, July 6th. In this course students will experience the drama and beauty of the urban and rural landscape. On numerous field trips they will hone their camera technique as well as learn elements of composition and develop a personal style. Students will learn the fundamentals of Photoshop and they will also be introduced to the beauty of black and white in Silver Efex software. Digital SLR cameras will be provided.

AS.371.180. **Exploring Line. 2 Credits.**

This challenging yet creatively playful course presents abstract, perceptual and conceptual concepts in art to understand line, one of the elements of art, from multiple perspectives, materials and practices. Be prepared to collaborate and experiment! Through an intense exploration of line, students will create artworks exploring line as marks on a flat surface (drawing), lines that communicate data (design), lines that build form (sculpture) and lines that embody movement (performance and video). Possible assignments will include projects with drawing, printmaking, fiber, cell phone video, installation, unconventional or recycled materials and collaboration. • This is not a drawing class but a multimedia course on one of the elements of art. Instructor approval and attendance at first class is mandatory.

AS.371.185. **Printmaking: Multiples and Variations. 3 Credits.**

In this course students learn to create marks, textures and imagery using a variety of printmaking techniques. Students create relief and intaglio printing matrices and practice printing by hand and with a press to reproduce their images. The class culminates with explorations of layered printing, monoprinting, and mixed media approaches to create unique 2-dimensional and 3-dimensional works. Attendance in first class is mandatory. No prior experience is needed.
AS.371.186. Fundamentals of Design Drawing and 3-D Visualization. 2 Credits.
This course introduces the tools, techniques, and technologies of design representation in a project-based setting. Students will build drawing skills, learn the principles of perspective, and explore theories and applications of design media and emerging digital technologies. Designing projects at various scales from the hand-held object to the public realm, we will develop creative problem solving, design thinking, and iterative design methodologies, leaving the course with the ability to apply the foundations of design to any discipline. Special note: This spring our course will be geared toward collaborative and site-based practices. Class meetings will begin with remote instruction and collaboration, and expand to include site visits as the season progresses. This course will satisfy the foundation drawing class for the art minor.

This is an intermediate drawing class that builds on the concepts and skills in Studio Drawing 1. Students will explore contemporary and conceptual approaches to drawing while further developing their skills in various graphic mediums. Risk taking and experimentation will be encouraged while learning about contemporary practices in the medium. The course will conclude with students creating an individual series of drawings of their choice. AS.371.131 OR AS.371.186

What makes an image truthful? Students will create drawings utilizing both traditional and unconventional processes through the lens of historical and political illustrations, propaganda graphics and misinformation, and current events. The course is anchored in, but not limited to, the art practices of Kara Walker's slavery narrative, George Grosz's political caricatures of First World War Germany, historical war posters, Hugo Crosthwaite's depiction of the US/MX border to Coronavirus "beauty shot." Projects may include revising a historical artwork, manipulating propaganda graphics of the past and the present, redrawing a visual data, and designing a personal narrative drawing project. Field trips, technical demos, discussions, and lectures will provide context and support for students to become image-makers of their own narrative and history. Attendance in first class is mandatory. Recommended but not required: AS.371.131

AS.371.211. Artist Books: Draft, Print, Stitch. 3 Credits.
In this studio art class students will create three artist books taught by three different CVA faculty. The first four weeks will investigate the book as a technological and cultural artifact, exploring historically what the book is and does, and as a cognitive aid and engine for ideation. Students will create a blank book that they use for their creative explorations. The second section will use printmaking techniques such as paper lithography, xerox transfers, and relief printmaking combined with quick and ephemeral folding structures in an effort to understand both printmaking and bookmaking's rich history in dissemination of ideas, democracy, and social change. This section will participate in a class zine exchange. The third section of the course will explore embroidery and weaving to navigate language and mark making. Students will explore the relationship between poetry, storytelling, and fiber processes to create a narrative textile.

AS.371.215. Hybrid Photography; Analog and Digital Experimentation. 3 Credits.
This course will introduce students to the basic use of the digital camera, Adobe photoshop post processing, basic darkroom printing and a variety of techniques for making images using analog and digital techniques. Students will learn a variety of alternative processes such as Photograms in contemporary practices, Chemigrams, and nature printing techniques such as Lumen Prints, Chlorophyll prints and Anthotypes. Through lectures, demos and hands on experimentation, students will learn how to creatively combine two worlds of technology, digital and analog, to make unique images.

AS.371.226. Sculptural Fibers. 3 Credits.
The fabric of the universe, a wrinkle in time and space: our physical universe is frequently described through fiber metaphors. Fiber processes are algorithmic. They grow exponentially, they fold, they tear, they wrinkle. These processes function as a pliable plane that can be bent, stretched, and turned inside out. This course offers students an opportunity to explore fiber processes through this sculptural lens. Topics include knitting, crochet, basketry, and lace as they come together to form sculptural armatures and objects. Together we will explore the physical properties of fiber and textiles, how they take up space and function in our world. Attendance in first class is mandatory. Recommended but not required: AS.371.126 Fiber Art and the String Revolution.

AS.371.228. Investigations in Still Life Photography. 3 Credits.
Students will learn approaches to taking still life photographs and expressing their relationships to the objects surrounding their daily lives. Still life will be defined as the objects we purchase, own, consume, observe and arrange. Investigations into the still life will be focused on table top, food, found objects, and product photography. Technical explorations include the exposure triangle, depth of field, basic lighting control, framing, and visual design. Class will consist of live-demonstrations, independent studio work, discussions, and photography critiques. Students will complete a portfolio of printed images by the end of the class. A digital camera with manual control, tripod, Lightroom, and Adobe Photoshop will be supplied for this course. Students will be approved into the course after enrollment in SIS. Attendance in first class is mandatory.

AS.371.230. Portrait Photography. 3 Credits.
In this course students will gain insight into the art of portraiture with projects such as the self-portrait, collaborative portraiture, portrait of a place, and image and text. In representing people, we'll explore developing an understanding of people in relation to power and representation, the body, environments and society. Lectures on the history of the portrait and its practitioners, new directions in portraiture as well as empathy and the gaze will inspire students to bring greater depth to their image making. Camera experience is a plus but not a requirement. Cameras will be provided for the semester. First class is mandatory.

AS.371.233. Environmental Photography. 3 Credits.
Environmental cognition, consciousness and communication are formed, deciphered and internalized with the support of visual representations and, in particular, photography. Images increasingly structure our experience of nature, environmental problems, human-environmental relations, and ecological awareness. Students will engage with the local community, identify and investigate environmental issues affecting Baltimore, participate in photographic critiques, and develop a final, in-depth environmental photo-documentary project. This studio/seminar course is designed with an emphasis on individual research and practice. Attendance in first class is mandatory.
AS.371.234. Oil Painting II. 3 Credits.
Students who have mastered basic painting skills undertake sustained projects, including portrait and plein air landscape work. Slide lectures and handouts deepen students' appreciation of representational traditions. Advanced techniques, materials, and compositional issues are also investigated. Recommended Course Background: AS.371.133 or equivalent.
AS.371.131 OR AS.371.133 or instructor's permission.

This studio art course will introduce students to conceptual techniques and applications of digital photography. In this course, we will foster creative exploration and uses of technology through advanced digital capture, image construction and manipulation, substrate choices, and methods of digital output. We will have an in-depth look at historic and contemporary photography as it relates to culture, current trends, and classroom assignments. Students will also engage in conversation and classroom critique throughout the semester to aid their dialogue and understanding of contemporary art. Attendance in first class is mandatory. Completion of AS.371.152 is suggested.

AS.371.250. Life Drawing. 3 Credits.
An intermediate drawing course focusing on drawing the human form and studying anatomy for artists. Working from live models, students will draw the clothed and nude figure, portrait drawing, gesture drawing and anatomy tracings of the skeleton and muscles. Students will use drawing skills learned in Drawing I to explore the human form using wet and dry material, collage and color. The class will study the figure drawings and paintings from Renaissance to contemporary artists. Attendance in 1st class is mandatory.
AS.371.131 or AS.371.187 or permission of Instructor.

AS.371.302. Photographic Portfolio. 3 Credits.
In this upper level course, students will work on a semester-long project. They will develop their ideas within a seminar style format that allows for conversation and debate and provides a forum for the evolution of their work. Students will learn advanced techniques in Photoshop, Nik software and Lightroom to enhance content and develop a personal style. Through a combination of critique, lecture, and lab, students will complete a portfolio of ten printed images that work together in a series. Approval for this course will be considered after enrollment on SIS. Attendance in 1st class is mandatory.

AS.371.303. Documentary Photography. 3 Credits.
In this course, we will explore different genres and approaches to documentary photography and the questions inherent to this mode of image-making like representation, storytelling, records and archives, journalism, community engagement, research and personal perspective. Baltimore neighborhoods and contemporary issues will provide inspiration for student work. Students will learn camera operation, photo editing and produce a final documentary project on a subject of their choice as the culmination of their semester's work. Digital SLRs are available on loan for the semester. Attendance at first class is mandatory.

AS.371.307. The Photographer's Book. 3 Credits.
Students create a handmade book of photographs that illustrate a favorite piece of text. They may work with poetry, song lyrics, a play, a narrative, a blog, a diary, any writing (including their own). Students may look at historical texts such as medieval manuscripts or even scientific treatises. The possibilities are endless. We will take fieldtrips to book collections at the George Peabody Library, Evergreen Museum and Library and the Betty and Edgar Sweren Collection. This course will be taught by a photographer and an artist book designer. A previous photography class is a plus, but not a requirement. Students who would like to combine their painting and drawing skills with their photographs are welcome to do so.
Attendance in first class is mandatory. Students will have an exhibition of their artist books in the Special Collections Rare Books room of the MSE library. Approval for this course will be considered after enrollment in SIS.

AS.371.330. Evergreen as Muse: A Photographic Exploration. 3 Credits.
In this course taught by an historian and a fine art photographer, students are introduced to the delights of the Evergreen Museum and Library of the Johns Hopkins University. The history of Evergreen, its inhabitants including family members and servants, the world-famous library, art collection and grounds, all serve to inspire students to produce a portfolio of photographs. There will be an exhibition showcasing student work at the museum as the culmination of their semester's work.
AS.371.152 OR AS.371.162 OR AS.371.303

AS.371.381. Advanced Projects in Visual Art. 3 Credits.
In this studio course students will create artwork based on their individual research and concerns in art. Through artist presentations, readings, discussions and museum and gallery visits the students will advance their skills and understanding of contemporary art and theory. This class is open to studio and digital photography students who want to engage with other serious art students and advance their art practice and research.
AS.371.131 OR AS.371.133 OR AS.371.152

AS.371.501. Independent Study. 2 Credits.
You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration > Online Forms.

AS.371.502. Independent Study. 1 - 3 Credits.
You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration > Online Forms.

AS.371.590. Independent Study. 3 Credits.
You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration > Online Forms.

Cross Listed Courses

Anthropology

AS.070.379. Social Ecology Studio. 3 Credits.
This course will grapple with the social and cultural dimensions of contemporary ecological problems through a local, project-based approach. Coursework will be organized on a studio basis in partnership with a local environmental organization, Friends of Stony Run. Continuing a collaborative project initiated in the fall of 2019, we will work together to develop interpretive materials for the Stony Run stream and urban watershed adjoining our campus.
Applied and Computational Mathematics
EN.625.638. Neural Networks. 3 Credits.
This course provides an introduction to concepts in neural networks and connectionist models. Topics include parallel distributed processing, learning algorithms, and applications. Specific networks discussed include Hopfield networks, bidirectional associative memories, perceptrons, feedforward networks with back propagation, and competitive learning networks, including self-organizing and Grossberg networks. Software for some networks is provided. Prerequisite(s): Multivariate calculus and linear algebra. Course Note(s): This course is the same as EN.605.647 Neural Networks.

Center for Africana Studies
AS.362.309. Performing the Archive 2022: 200 Years of US-Liberia Migration. 3 Credits.
This seminar will explore some of the pivotal historical and contemporary connections between the US and Liberia since the first Black American settlers arrived in West Africa with the American Colonization Society in 1822. This course asks: What are implications of these stories of migration and reception for how we make sense of global anti-Blackness in the contemporary moment? How does performance provoke new questions about shared histories of those impacted by colonialism and the transatlantic slave trade? Why is a more in-depth understanding of 19th century Black political thought and the precolonial West African indigenous category necessary for developing theory on the political economy of race today? Through the lens of performance studies, students will analyze the documents in the American Colonization Society archive, to reimagine these early encounters as informed by historical documentation including folklore and pan-Africanist theory. Through exploring a range of historical and contemporary materials that center the problematic “indigenous/settler” binary, students will engage in a dramaturgical process which presents powerful possibilities for unlearning historical misrepresentations. In particular, students will develop theater-based projects that interrogate the spatio-temporal connections between the stories of both, free Blacks and those who were enslaved in Maryland and manumitted to go to Liberia, and the contemporary politics of Liberia-US migration.

Classics
AS.040.218. Celebration and Performance in Early Greece. 3 Credits.
Surviving imagery suggests that persons in Minoan and Mycenaean societies engaged in various celebratory performances, including processions, feasts, and ecstatic dance. This course explores archaeological evidence of such celebrations, focusing on sociocultural roles, bodily experience, and interpretive challenges.

Computer Science
EN.605.613. Introduction to Robotics. 3 Credits.
This course introduces the fundamentals of robot design and development with an emphasis on autonomy. Robot design, navigation, obstacle avoidance, and artificial intelligence will be discussed. Topics covered in robot design include robot structure, kinematics and dynamics, the mathematics of robot control (multiple coordinate systems and transformations), and designing for autonomy. Navigation topics include path planning, position estimation, sensors (e.g., vision, ultrasonics, and lasers), and sensor fusion. Obstacle avoidance topics include obstacle characterization, object detection, sensors and sensor fusion. Topics to be discussed in artificial intelligence include learning, reasoning, and decision making. Students will deepen their understanding through several assignments and the term-long robot development project.

EN.605.617. Introduction to GPU Programming. 3 Credits.
This course will teach the fundamentals needed to utilize the ever-increasing power of the GPUs housed in the video cards attached to our computers. For years, this capability was limited to the processing of graphics data for presentation to the user. With the CUDA and OpenCL frameworks, programmers can develop applications that harness this power directly to search, modify, and quickly analyze large amounts of various types of data. Students will be introduced to core concurrent programming principles, along with the specific hardware and software considerations of these frameworks. In addition, students will learn canonical algorithms used to perform high-precision mathematics and data transformations. Class time will be split between lectures and hands-on exercises. There will be two individual projects in both CUDA and OpenCL programming, which will allow students to independently choose demonstrable goals, develop software to achieve those goals, and present the results of their efforts.

EN.605.621. Foundations of Algorithms. 3 Credits.
This follow-on course to data structures (e.g., 605.202) provides a survey of computer algorithms, examines fundamental techniques in algorithm design and analysis, and develops problem-solving skills required in all programs of study involving computer science. Topics include advanced data structures (red-black and 2-3-4 trees, union-find), recursion and mathematical induction, algorithm analysis and computational complexity (recurrence relations, big-O notation, NP-completeness), sorting and searching, design paradigms (divide and conquer, greedy heuristic, dynamic programming, amortized analysis), and graph algorithms (depth-first and breadth-first search, connectivity, minimum spanning trees, network flow). Advanced topics are selected from among the following: randomized algorithms, information retrieval, string and pattern matching, and computational geometry. Prerequisite(s): EN.605.202 Data Structures or equivalent. EN.605.203 Discrete Mathematics or equivalent is recommended. Course Note(s): The required foundation courses may be taken in any order but must be taken before other courses in the degree. Students can only earn credit for one of EN.605.620, EN.605.621, or EN.685.621.

EN.605.624. Logic: Systems, Semantics, and Models. 3 Credits.
Traditionally, logic is the study of correct reasoning. In the last few decades, logic has become increasingly important to knowledge representation – a subfield of artificial intelligence concerned with developing representations of the world (often called ontologies) that aid computers in understanding and making sense of data. This course will promote both a theoretical and practical understanding of logic as a stepping stone for working in contemporary knowledge representation. We will begin with a review of categorical, propositional, and predicate logic. We will then survey modal logics, which include systems that represent necessity and probability, as well as other systems that represent time, and moral notions such as obligation and permissibility. The second half of the course will then introduce the semantic web and ontology engineering. Students will explore the top-level ontology Basic Formal Ontology (BFO) and gain familiarity using mereological and temporal relations. In addition, students will create ontologies in the web ontology language (OWL2) and use the language SPARQL to query knowledge graphs. Students will have the option of writing either a research paper or creating an ontology in OWL with slides as part of a final project.
EN.605.635. Cloud Computing. 3 Credits.
Cloud computing helps organizations realize cost savings and efficiencies without spending capital resources up front, while modernizing and expanding their IT capabilities. Cloud-based infrastructure is rapidly scalable, secure, and accessible over the Internet—you pay only for what you use. So, enterprises worldwide, big and small, are moving toward cloud-computing solutions for meeting their computing needs, including the use of Infrastructure as a Service (IaaS) and Platform as a Service (PaaS). We have also seen a fundamental shift from shrinkwrapped software to Software as a Service (SaaS) in data centers across the globe. Moreover, providers such as Amazon, Google, and Microsoft have opened their datacenters to third parties by providing low-level services such as storage, computation, and bandwidth. This trend is creating the need for a new kind of enterprise architect, developer, QA, and operational professional—someone who understands and can effectively use cloud-computing technologies and solutions. In this course, we discuss critical cloud topics such as cloud service models (IaaS, PaaS, SaaS); virtualization and how it relates to cloud; elastic computing; cloud storage; cloud networking; cloud databases; cloud security; and architecting, developing, and deploying apps in the cloud. The format of this course will be a mix of lectures, and hands-on demos. Upon completing this course, students will have a deeper understanding of what cloud computing is and the various technologies that make up cloud computing, along with hands-on experience working with a major cloud provider. Prerequisite(s): 605.202 Data Structures.

EN.605.646. Natural Language Processing. 3 Credits.
This course surveys the principal difficulties of working with written language data, the fundamental techniques that are used in processing natural language, and the core applications of NLP technology. Topics covered in the course include language modeling, text classification, labeling sequential data (tagging), parsing, information extraction, question answering, machine translation, and semantics. The dominant paradigm in contemporary NLP uses supervised machine learning to train models based on either probability theory or deep neural networks. Both formalisms will be covered. A practical approach is emphasized in the course, and students will write programs and use open source toolkits to solve a variety of problems. Course prerequisite(s): There are no formal prerequisite courses, although having taken any of 605.649 Introduction to Machine Learning, 605.744 Information Retrieval, or 605.645 Artificial Intelligence is helpful. Course note(s): A working knowledge of Python is assumed. While some of the assigned exercises can be done in any programming language, we will sometimes provide example code in Python, and many of the labs are best solved in Python.

EN.605.647. Neural Networks. 3 Credits.
This course provides an introduction to concepts in neural networks and connectionist models. Topics include parallel distributed processing, learning algorithms, and applications. Specific networks discussed include Hopfield networks, bidirectional associative memories, perceptrons, feedforward networks with back propagation, and competitive learning networks, including self-organizing and Grossberg networks. Software for some networks is provided. Prerequisite(s): Multivariate calculus and linear algebra. Course Note(s): This course is the same as 625.638 Neural Networks.

EN.605.649. Introduction to Machine Learning. 3 Credits.
EN.605.649 - Introduction to Machine LearningAnalyzing large data sets ("Big Data"), is an increasingly important skill set. One of the disciplines being relied upon for such analysis is machine learning. In this course, we will approach machine learning from a practitioner's perspective. We will examine the issues that impact our ability to learn good models (e.g., inductive bias, the curse of dimensionality, the bias-variance dilemma, and no free lunch). We will then examine a variety of approaches to learning models, covering the spectrum from unsupervised to supervised learning, as well as parametric versus non-parametric methods. Students will explore and implement several learning algorithms, including logistic regression, nearest neighbor, decision trees, and feed-forward neural networks, and will incorporate strategies for addressing the issues impacting performance (e.g., regularization, clustering, and dimensionality reduction). In addition, students will engage in online discussions, focusing on the key questions in developing learning systems. At the end of this course, students will be able to implement and apply a variety of machine learning methods to real-world problems, as well as be able to assess the performance of these algorithms on different types of data sets. Prerequisite(s): EN.605.202 - Data Structures or equivalent.

EN.605.662. Data Visualization. 3 Credits.
This course explores the underlying theory and practical concepts in creating visual representations of large amounts of data. It covers the core topics in data visualization: data representation, visualization toolkits, scientific visualization, medical visualization, information visualization, flow visualization, and volume rendering techniques. The related topics of applied human perception and advanced display devices are also introduced. Prerequisite(s): Experience with data collection/analysis in data-intensive fields or background in computer graphics (e.g., 605.667 Computer Graphics) is recommended.

EN.605.743. Advanced Artificial Intelligence. 3 Credits.
Many advanced artificial intelligence systems are using both Machine Learning and Symbolic AI to solve subproblems. This course builds on the foundations of EN.605.645 Artificial Intelligence by delving more deeply into those AI algorithms and approaches that go under the name of Good Old Fashioned AI or Symbolic AI. In this course, we will cover logic programming, expert systems and business rules, fuzzy logic, case based reasoning, and knowledge graphs. We will also explore more advanced versions of planning and reinforcement learning algorithms. The instructor may add additional topics as warranted. Prerequisite(s): EN.605.645 Artificial Intelligence or permission of instructor. EN.605.645 Artificial Intelligence
EN.605.649. Introduction to Machine Learning; multivariate calculus.
This course focuses on recent advances in machine learning and on developing skills for performing research to advance the state of knowledge in machine learning. The material integrates multiple ideas from basic machine learning and assumes familiarity with concepts such as inductive bias, the bias-variance trade-off, the curse of dimensionality, and no free lunch. Topics range from determining appropriate data representations and models for learning, understanding different algorithms for knowledge and model discovery, and using sound theoretical and experimental techniques in assessing learning performance. Specific approaches discussed cover nonparametric and parametric learning; supervised, unsupervised, and semi-supervised learning; graphical models; ensemble methods; and reinforcement learning. Topics will be discussed in the context of research reported in the literature within the previous two years. Students will participate in seminar discussions and will present the results of a semester-long research project of their own choosing.

EN.605.649 Introduction to Machine Learning; multivariate calculus; Students cannot receive credit for both EN.605.746 and EN.625.742.

EN.605.746. Advanced Machine Learning. 3 Credits.
This course focuses on recent advances in machine learning and on developing skills for performing research to advance the state of knowledge in machine learning. The material integrates multiple ideas from basic machine learning and assumes familiarity with concepts such as inductive bias, the bias-variance trade-off, the curse of dimensionality, and no free lunch. Topics range from determining appropriate data representations and models for learning, understanding different algorithms for knowledge and model discovery, and using sound theoretical and experimental techniques in assessing learning performance. Specific approaches discussed cover nonparametric and parametric learning; supervised, unsupervised, and semi-supervised learning; graphical models; ensemble methods; and reinforcement learning. Topics will be discussed in the context of research reported in the literature within the previous two years. Students will participate in seminar discussions and will present the results of a semester-long research project of their own choosing.

EN.605.746. Advanced Machine Learning. 3 Credits.
This course focuses on recent advances in machine learning and on developing skills for performing research to advance the state of knowledge in machine learning. The material integrates multiple ideas from basic machine learning and assumes familiarity with concepts such as inductive bias, the bias-variance trade-off, the curse of dimensionality, and no free lunch. Topics range from determining appropriate data representations and models for learning, understanding different algorithms for knowledge and model discovery, and using sound theoretical and experimental techniques in assessing learning performance. Specific approaches discussed cover nonparametric and parametric learning; supervised, unsupervised, and semi-supervised learning; graphical models; ensemble methods; and reinforcement learning. Topics will be discussed in the context of research reported in the literature within the previous two years. Students will participate in seminar discussions and will present the results of a semester-long research project of their own choosing.

EN.605.747. Evolutionary and Swarm Intelligence. 3 Credits.
Recently, principles from the biological sciences have motivated the study of alternative computational models and meta-heuristic approaches to problem solving. Proceeding from a machine learning perspective, this course explores how principles from theories of evolution, natural selection, and swarming behavior can be used to construct machines that exhibit nontrivial behavior. In particular, the course covers techniques from evolutionary computation and swarm intelligence for developing software agents capable of solving problems as members of a larger population of agents. Specific topics addressed include representation and schemata; selection, reproduction, and recombination; theoretical models of computational intelligence; optimal allocation of trials (i.e., bandit problems); search, optimization, and machine learning; evolution of programs; population and swarm dynamics; and emergent behavior. Students will participate in seminar discussions and will complete and present the results of an individual project.

EN.605.649 Introduction to Machine Learning; multivariate calculus.

Cybersecurity
EN.695.637. Introduction to Assured AI and Autonomy. 3 Credits.
In order to drive a future where artificial intelligence (AI) enabled autonomous systems are trustworthy contributors to society, these capabilities must be designed and verified for safe and reliable operation and they must be secure and resilient to adversarial attacks. Further, these AI enabled autonomous systems must be predictable, explainable and fair while seamlessly integrated into complex ecosystems alongside humans and technology where the dynamics of human-machine teaming are considered in the design of the intelligent system to enable assured decision-making. In this course, students are first introduced to the field of AI, covering fundamental concepts, theory, and solution techniques for intelligent agents to perceive, reason, plan, learn, infer, decide and act over time within an environment often under conditions of uncertainty. Subsequently, students will be introduced to the assurance of AI enabled autonomous systems, including the areas of AI and autonomy security, resilience, robustness, fairness, bias, explainability, safety, reliability and ethics. This course concludes by introducing the concept of human-machine teaming. Students develop a contextual understanding of the fundamental concepts, theory, problem domains, applications, methods, tools, and modeling approaches for assuring AI enabled autonomous systems. Students will implement the latest state-of-the-art algorithms, as well as discuss emerging research findings in AI assurance.

Data Analytics
SA.100.501. Statistics for Data Analysis. 4 Credits.
Covers basic statistical tools for data analysis. Emphasizes facility in problem-solving in statistical inference and two-variable regression and correlation analysis. Presents descriptive statistics, probability and probability distributions and their use in hypothesis testing. Uses computer to solve problems and to reinforce statistical concepts. Students may not register for this class if they have already received credit for SA.340.709[C].

Data Science
EN.685.621. Algorithms for Data Science. 3 Credits.
This course provides a survey of computer algorithms, examines fundamental techniques in algorithm design and analysis, and develops problem-solving skills required in all programs of study involving data science. Topics include advanced data structures for data science (tree structures, disjoint set data structures), algorithm analysis and computational complexity (recurrence relations, big-O notation, introduction to complexity classes (P, NP and NP-completeness)), data transformations (FFTs, principal component analysis), design paradigms (divide and conquer, greedy heuristic, dynamic programming), and graph algorithms (depth-first and breadth-first search, ordered and unordered trees). Advanced topics are selected from among the following: approximation algorithms, computational geometry, data preprocessing methods, data analysis, linear programming, multi-threaded algorithms, matrix operations, and statistical learning methods. The course will draw on applications from Data Science. Course Prerequisite(s): EN.605.201 Introduction to Programming Using Java or equivalent. EN.605.203 Discrete Mathematics or equivalent is recommended. Course Note(s): This required foundation course must be taken before other 605.xxx courses in the degree. This course does not satisfy the foundation course requirement for Bioinformatics, Computer Science, or Cybersecurity. Students can only earn credit for one of EN.605.620, EN.605.621, or EN.685.621.

Development, Climate, and Sustainability
SA.500.134. Global Energy and Climate Policy. 4 Credits.
... forthcoming.
SA.500.135. Economic Development in Latin America. 4 Credits.
This course examines the economics of Latin America in contemporary comparative perspective. Starting with an overview of long term trends in growth and structural transformation, the course moves on to consider the theoretical approaches which economists have adopted to understand development processes in the region. The introductory phase of the course completed, the next three lectures survey the key macroeconomic themes of fiscal policy, monetary policy and the external balance. The difficulties countries in the region have faced in maintaining macroeconomic stability is an important theme of the course and is referred back to again and again in subsequent sessions. An equally important topic, that of poverty and inequality, forms the basis for the next section of the course. The remainder of the course deals with the challenge Latin America faces as it struggles to compete in the global economy. The course will entail formal lectures and student presentations/group discussions. Each student (in conjunction with one or two colleagues) will be expected to prepare and present one 20 minute presentation at some point during the course. The presentations will be followed by group discussions led by the course lecturer. Broad indications of themes for the talks provided in this outline. More precise details of the talk topics – along with guidance on sources and formats – will be given in week one of the course.

SA.500.136. Agricultural Development, Poverty Reduction and Food Security. 4 Credits.

...forthcoming

Electrical and Computer Engineering

EN.525.661. UAV Systems and Control. 3 Credits.
This hardware-supplemented course covers the guidance, navigation- and control principles common to many small fixed-wing and multirotor unmanned aerial vehicles (UAVs). Building on classical control systems and modeling theory, students will learn how to mathematically model UAV flight characteristics and sensors, develop and tune feedback control autopilot algorithms to enable stable flight control, and fuse sensor measurements using extended Kalman filter techniques to estimate the UAV position and orientation. Students will realize these concepts through both simulation and interaction with actual UAV hardware. Throughout the course, students will build a full 6-degree-of-freedom simulation of controlled UAV flight using MATLAB and Simulink. Furthermore, students will reinforce their UAV flight control knowledge by experimenting with tuning and flying actual open-source quadrotor UAVs. Prerequisite(s): Background in control systems (e.g., EN.525.609 Continuous Control Systems) and matrix theory along with a working knowledge of MATLAB. Experience using Simulink is desired. Existing familiarity with C programming language, electronics, and microcontrollers will be helpful but is not required.

EN.525.670. Machine Learning for Signal Processing. 3 Credits.
This course will focus on the use of machine learning theory and algorithms to model, classify, and retrieve information from different kinds of real world signals such as audio, speech, image, and video. EN.525.627 Digital Signal Processing and EN.525.614 Probability and Stochastic Processes for Engineers

EN.525.724. Introduction to Pattern Recognition. 3 Credits.
This course focuses on the underlying principles of pattern recognition and on the methods of machine intelligence used to develop and deploy pattern recognition applications in the real world. Emphasis is placed on the pattern recognition application development process, which includes problem identification, concept development, algorithm selection, system integration, and test and validation. Machine intelligence algorithms to be presented include feature extraction and selection, parametric and non-parametric pattern detection and classification, clustering, artificial neural networks, support vector machines, rule-based algorithms, fuzzy logic, genetic algorithms, and others. Case studies drawn from actual machine intelligence applications will be used to illustrate how methods such as pattern detection and classification, signal taxonomy, machine vision, anomaly detection, data mining, and data fusion are applied in realistic problem environments. Students will use the MATLAB programming language and the data from these case studies to build and test their own prototype solutions.

EN.525.614 Probability and Stochastic Processes for Engineers or equivalent. A course in digital signal or image processing is recommended, such as EN.525.627 Digital Signal Processing, EN.525.619 Introduction to Digital Image and Video Processing, 525.643 Real-Time Computer Vision, or 525.746 Image Engineering.

EN.525.733. Deep Learning for Computer Vision. 3 Credits.
Recent technological advances coupled with increased data availability have opened the door for a wave of revolutionary research in the field of Deep Learning. In particular, Deep Neural Networks (DNNs) continue to improve on state-of-the-art performance in many standard computer vision tasks including image classification, segmentation, object recognition, object localization, and scene recognition. With an emphasis on computer vision, this course will explore deep learning methods and applications in depth as well as evaluation and testing methods. Topics discussed will include network architectures and design, training methods, and regularization strategies in the context of computer vision applications. Following a seminar format, students will be expected to read, understand, and present recent publications describing the current state-of-the-art deep learning methods. Additionally, team projects will give students an opportunity to apply deep learning methods to real world problems. Prerequisite(s): Students should have taken courses in computer vision and machine learning/pattern recognition, have basic familiarity with OpenCV, Python and C++, as well as prior class instruction in neural networks.

EN.525.770. Intelligent Algorithms. 3 Credits.
Intelligent algorithms are, in many cases, practical alternative techniques for tackling and solving a variety of challenging engineering problems. For example, fuzzy control techniques can be used to construct nonlinear controllers via the use of heuristic information when information on the physical system is limited. Such heuristic information may come, for instance, from an operator who has acted as a “human-in-the-loop” controller for the process. This course investigates a number of concepts and techniques commonly referred to as intelligent algorithms; discusses the underlying theory of these methodologies when appropriate; and takes an engineering perspective and approach to the design, analysis, evaluation, and implementation of intelligent systems. Fuzzy systems, genetic algorithms, particle swarm and ant colony optimization techniques, and neural networks are the primary concepts discussed in this course, and several engineering applications are presented along the way. Expert (rule-based) systems are also discussed within the context of fuzzy systems. An intelligent algorithms research paper must be selected from the existing literature, implemented by the student, and presented as a final project. Prerequisite(s): Student familiarity of system-theoretic concepts is desirable.
EN.525.786. Human Robotics Interaction. 3 Credits.
This course provides an investigation of human-robot interaction and prosthetic control, with a focus on advanced man-machine interfaces including neural signal processing, electromyography, and motion tracking interfaces for controlling and receiving feedback from robotic devices. The course will also cover human physiology and anatomy, signal processing, intent determination, communications between the human and the device, haptic feedback, and telepresence. It is designed to be a hands-on course with class time spent in the dedicated robotics lab designing interfaces and performing experiments in a Virtual Integration Environment (VIE) and with robotic devices. Additional time in the lab, outside of class time, may be required to complete the course project. Programming for the class will be in MATLAB and Simulink. Prerequisite(s): Linear algebra, ordinary differential equations, and programming experience with Python or MATLAB.

Energy, Resources & Environment
SA.680.680. Introduction to Energy, Resources & Environment. 4 Credits.
This course introduces students to the fundamentals of energy, resources, and the environment. It covers a wide range of topics, including methodologies for electricity markets, the challenge of climate policy, and the management of air pollution. It also introduces a host of key concepts and analytical frameworks that underpin policy analysis in the field, such as notions of collective action and the role of regulatory agencies in monopolistic markets. The course pays particular attention to the energy-environment nexus, including the challenge of low-carbon development in an era of climate change. The course lays the foundation for further courses in the program.

First Year Seminars
AS.001.129. FYS: Environmental Poisons. 1 Credit.
An exploration of the occurrence and potential effects of poisons in the environment, from naturally occurring ones such as arsenic to those that may be introduced by mankind such as nuclear waste.

AS.001.157. FYS: Leonardo da Vinci - Art, Science, and Medicine. 3 Credits.
How does a notary’s son trained as a painter gain expertise in the construction of machines and acquire knowledge of the principles of optics, human anatomy, the flight of birds, the dynamics of air and water? How did an artist/engineer who brought few projects to completion come to have such a huge impact on later generations? This First-Year Seminar will focus critically on the myth of Leonardo’s singularity while showing his achievements to be characteristic of the artisanal culture of his time.

AS.001.162. FYS: From Shakespeare to Baltimore. 3 Credits.
This First-Year Seminar is designed around what is on stage in Baltimore this fall. We will attend several plays, both professional productions at theatres in the city and student productions at JHU. We will pay attention to the interpretation of plays on the page, and to the ways that scripts materialize as performances on the stage. We will place these performances in the context of larger theatre histories, studying great plays from the age of Shakespeare to contemporary American theatre. No acting required – just the desire to explore the theatre of today.

AS.001.167. FYS: The Natural History of the Homewood Campus. 3 Credits.
Johns Hopkins University Homewood campus and its surroundings is a wonderful green space in the middle of Baltimore City. This First-Year Seminar will introduce students to both the visible and cryptic organisms living above- and belowground. A combination of observational and sampling techniques will be used to demonstrate how ecologists collect data about plants, insects, and other organisms. In the classroom, these field observations, combined with reading material will be used to discuss environmental issues including global biodiversity decline, invasive species, and the effects of human activities on local and global biodiversity patterns. By the end of the course students will be able to generate research questions based upon field observations and appreciate the diverse life forms on Earth and in our own backyard.

Health Policy and Management
PH.552.601. Foundational Principles of Public Health. 0.5 Credits.
Provides a broad systematic understanding of the executive practice of public health from its inception to modern day. Uses case studies, as well as ethical and public health practice frameworks to provide students with a grounding in “what is public health practice,” why it is important, and why it is contested.
Course location and modality is found on the JHSPH website (https://www.jhsph.edu/courses/).

History
AS.100.340. Asian American Art and Activism: Third World, Feminist, and Queer Solidarities. 3 Credits.
This interdisciplinary course surveys critical themes related to Asian American art and activism including perspectives from history, art and visual culture, literature and gender and sexuality studies.
Area: Writing Intensive

AS.100.410. Decolonizing The Museum: Case Studies. 3 Credits.
How do museums represent the world? The course will focus on the colonial legacy of museums and complicate discourses of decolonization by looking at a range of case studies. We will study the world’s fairs, artworks, artifacts, collections, curatorial practices, exhibition histories, repatriation requests, and exhibitionary modes of display, in order to analyze their relationship to histories of decolonization, temporality, translation, untranslatability, spectatorship, provenance, and the life of objects.

AS.100.601. Decolonizing The Museum: Case Studies.
How do museums represent the world? The course will focus on the colonial legacy of museums and complicate discourses of decolonization by looking at a range of case studies. We will study the world’s fairs, artworks, artifacts, collections, curatorial practices, exhibition histories, repatriation requests, and exhibitionary modes of display, in order to analyze their relationship to histories of decolonization, temporality, translation, untranslatability, spectatorship, provenance, and the life of objects.

Interdepartmental
AS.360.339. Planets, Life and the Universe. 3 Credits.
This multidisciplinary course explores the origins of life, planet formation, Earth’s evolution, extrasolar planets, habitable zones, life in extreme environments, the search for life in the Universe, space missions, and planetary protection. Recommended Course Background: Three upper level (300+) courses in sciences (Biophysics, Biology, Chemistry, Physics, Astronomy, Math, or Computer Science).
Students may not register for this class if they have already received credit for AS.020.334 OR AS.020.616 OR AS.171.333 OR AS.171.699 OR AS.270.335 OR AS.360.671
AS.360.408. Experiential Research Lab: “Holy” Conquest: Religion and Colonization in Sixteenth-Century Mexico. 3 Credits.

"When the Spanish unleashed their regime of colonization of what is present-day Mexico, their primary justification was the religious salvation of Indigenous peoples. Spaniards, along with other Europeans, arrived by the boatload to impose colonial order, taking up bureaucratic and ecclesiastical positions. The result was far from smooth—the sixteenth-century saw widespread disease, missionary violence on behalf of salvation, crop destruction and the recultivation of land, urban plans that radically altered the environment, the resettlement of entire populations, among other dramatic social and environmental events. This course investigates the complex and dynamic elements of colonial New Spain (as Mexico was called) from an interdisciplinary perspective. It tries to make sense of the chaotic landscape of the first century of Spanish colonial rule in New Spain. It is a research and writing intensive course that serves as an introduction to both the history and art history of this place and moment. Our meetings will act as a springboard for a group trip to Mexico during the January intersession to study objects and spaces in situ. Final projects will relate to materials viewed in person in Mexico. The costs for this trip are included for all students, no fees required. Knowledge of Spanish preferred but not required.

Area: Writing Intensive

AS.360.671. Planets, Life and the Universe.

Replace description with the following:—"This multidisciplinary course explores the origins of life, planet formation, Earth’s evolution, extrasolar planets, habitable zones, life in extreme environments, the search for life in the Universe, space missions, and planetary protection. Recommended Course Background: Three upper level (300+) courses in sciences (Biophysics, Biology, Chemistry, Physics, Astronomy, Math, or Computer Science)

Students may not register for this class if they have already received credit for AS.020.616 OR AS.020.334 OR AS.171.333 OR AS.171.699 OR AS.270.335 OR AS.360.339.

International Economics and Finance

SA.510.115. Public Sector Economics. 4 Credits.

The course analyzes both the role of the state in the economy, including its manifestation as a Welfare State, and the role played in the public sphere by civil society organizations. The first part deals with the theory of market failures and government failures, the theory of collective economic action, the economic theory of democracy, the analysis of tax systems. The second part of the course uses the concepts developed in the first part to analyze specific governmental institutions, expenditure programs and taxes in a comparative international perspective. These include health care (special attention will be devoted to the Covid-19 pandemic), social insurance, redistribution programs, education, the politics of institutional choice, government decentralization (federalism), political capitalism, the digital revolution and the labor market.

SA.510.116. Evolution of the World Economy. 4 Credits.

forthcoming...

SA.510.117. Asian Economic Development. 4 Credits.

This course gives a survey of the Asian economic development experience over the past half-century, with a focus on its international dimensions. In addition to evaluating the source of the remarkable growth and development of the region, the course considers the many challenges that the region has and will continue to face, from the Asian Financial Crisis in 1997-98 to the Covid-19 pandemic shock. It also looks at conflict and cooperation in the region in the 21st century.

Modern Languages and Literatures

AS.210.308. Acting French: learning about French language and culture through theater. 3 Credits.

This course proposes to enhance students’ verbal (pronunciation, intonation, syntax, vocabulary) and nonverbal skills (body language, vocal projection, spatial awareness) by performing excerpts from French and Francophone plays ranging from the Middle Ages to the 21st century. A closer analysis of these excerpts will lead us to consider how theater uses the physicality and immediacy of human experience to create a more universal form of connectivity with the world. Recommended course background: AS.210.301.

AS.211.231. Planet Amazonia: Culture, History, and the Environment. 3 Credits.

Without Amazonia, global warming could reach levels that threaten life on the planet. Yet, in an era of deforestation and climate change, Amazonia itself might be on the verge of disappearance, with disastrous consequences for the world. This course proposes interdisciplinary perspectives on Amazonia through a range of works drawn from history, anthropology, archeology, environmental studies, literature, and the arts. We’ll look at texts by European travelers and missionaries who contributed to the paradoxical image of Amazonia as a “virgin paradise” or a “green hell”; scientific studies and artists’ depictions of the region’s flora and fauna; the often-overlooked history of human occupation of the region; and projects to colonize, develop, or conserve the world’s largest tropical forest. What importance does Amazonia hold for Latin American and global geopolitics? How do art and literature, including indigenous writings, create, reinforce, or deconstruct clichés about the region? What alternative futures for our planet can Amazonia help us to imagine?

AS.211.327. Ecocinema: Framing Italy’s Environmental Crises. 3 Credits.

Over the past decade, growing numbers of filmmakers in Italy have addressed ecological crises in their work. This class takes an eco-critical approach to contemporary Italian cinema, examining a body of compelling place-centered stories that deal with local and global issues. Defining the scope of eco-cinema and the ways we can interrogate films as ecological texts, we shall screen earth-centered films that raise consciousness about the consequences of human manipulation of the natural world; the complicity of industry, government, and organized crime in creating environmental crises; and the effects of economic and social malaise. Screenings include iconic films such as Michelangelo Antonioni’s Red Desert (1963), more recent, critically acclaimed films such as Matteo Garrone’s Gomorrah (2008), Alice Rohrwacher’s Happy as Lazzaro (2018), and many others.

AS.211.329. Museums and Identity. 3 Credits.

The museum boom of the last half-century has centered largely around museums dedicated to the culture and history of identity groups, including national, ethnic, religious, and minority groups. In this course we will examine such museums and consider their long history through a comparison of the theory and practice of Jewish museums with other identity museums. We will study the various museological traditions that engage identity, including the collection of art and antiquities, ethnographic exhibitions, history museums, heritage museums, art museums, and other museums of culture. Some of the questions we will ask include: what are museums for and who are they for? how do museums shape identity? and how do the various types of museums relate to one another? Our primary work will be to examine a variety of contemporary examples around the world with visits to local museums including the Jewish Museum of Maryland, the National Museum of African American History and Culture and the National Museum of the American Indian.
AS.211.424. Climate Change Narratives: Human and Non-Human Transformative Storytelling. 3 Credits.
In The Great Derangement Indian novelist Amitav Ghosh writes that “the climate crisis is also a crisis of culture, and thus of imagination.” Worldwide, climate and environmental change is stirring the imaginary of novelists, filmmakers, and artists who are finding ways to frame, emplot, or even perform, an unmanageable phenomenon like climate change. How is climate change shaping new modes of storytelling and aesthetics? How do film, literature, and environmentally conscious art transform our perception of the world we inhabit and its unpredictable changes? Can climate change narratives help us to imagine futures of possibilities, maybe dystopian, uncertain, or even happy, but futures nonetheless? This multimedia course explores, through a transnational perspective, a variety of contemporary novels, films, and other media that attempt answer these questions.

AS.213.763. Contemporary Theater: Gender/Violence.
The course explores 21st-century German theater in its diverse aesthetic and textual forms. Due to comparatively generous funding, German non-commercial theater has over the last decades been able to develop, adapt, and maintain a great variety of at one point “experimental” artistic styles, including frequently stark depiction of gender and violence. We will focus on the ways in which the productions take up, amplify, displace, disrupt, and/or reinforce cultural codes and images of gender and violence both in their symbolic and physical dimension. Topics include the “directors’ theater,” political theater, “pop-theater,” “post-migratory theater,” postcolonial theater and live art. The readings may include Nobel laureate Elfriede Jelinek, Dea Loher, René Pollesch, Milo Rau, Falk Richter, Sasha Marianna Salzmann and various works of shared authorship such as She She Pop, Rimini Protokoll, Gintersdorfer/Klaßen, and Yael Ronen. The Tuesday sessions will be used for the joint viewing of production recordings. Taught in English. Course material in German. No sessions after March 27th.

AS.217.425. Latin American Ecocriticism. 3 Credits.
Increased awareness of climate change has led to a shift in the way we address and intervene in environmental issues in the new millennium. Yet the interest in making sense of the environment has a long history in literature and the arts. How have Latin American writers and artists understood and depicted their environments and environmental questions? How do the form and content of texts and cultural artifacts influence our understanding of the non-human world? Can works of fiction shape ecological transformations? In this course we will discuss texts from the early colonial period to the present, including the literary works of Graciliano Ramos, Horacio Quiroga, and Clarice Lispector; political ecology; film; Ana Mendieta’s earth-body art; contemporary experiments in bio-art; postcolonial theory; and the intersection of environmental justice with such topics as nationalism and human rights. Going beyond ecocriticism’s original focus on the Anglo-American world, we will engage recent scholarship on Latin America that sheds light on the region’s cultural and geopolitical importance to the global climate, with particular attention to Brazil. This course aims to introduce students to current debates in Latin American Ecocriticism and the Anthropocene and thus contribute to an incipient but expanding field.

Near Eastern Studies
AS.130.153. A (Virtual) Visit to the Louvre Museum: Introduction to the Material Culture of Ancient Egypt. 3 Credits.
This course will present the Egyptological collections of the musée du Louvre in Paris, room by room, as in a real visit. The experience will be enhanced by the study of objects that are not shown to the public but are kept in the reserves of the museum. From the 4th millennium BC to Roman time, the iconic “masterpieces” of this world-renowned art museum, as well as its little-known artifacts, will allow us to explore the history and material culture of ancient Egypt. We will also learn to observe, describe and analyze archaeological objects, in a global manner and without establishing a hierarchy between them, while questioning their place in the museum and its particular language. The objective will be to go beyond the objects themselves and answer, in fine, the following questions: What do these objects tell us about the men and women who produced them, exchanged them, used them, and lived among them in antiquity? What do they also reveal about those who discovered them in Egypt, several millennia later, about those who collected them and sometimes traded them, and what does this say about the relations between Egypt and the Western countries over time? The courses will be complemented by visits to the rich Egyptian collections in Baltimore.

AS.130.245. The Archaeology of Gender in the Ancient Eastern Mediterranean. 3 Credits.
How do art historians and archaeologists recover and study genders and sexualities of ancient people? This writing-intensive seminar looks at texts and objects from ancient Egypt, Assyria, and Greece through the lens of gender and sexuality studies. Beyond exploring concepts of gender in the ancient Eastern Mediterranean, students will also consider how modern scholars have approached, recovered, and written about ancient gender identities. There are no prerequisites for this course. Area: Writing Intensive

AS.130.378. Geoarchaeology: Applications of Earth Science to Archaeology. 3 Credits.
Geoarchaeology is a multidisciplinary subfield that applies the tools and techniques of earth science to understand ancient humans and their interactions with environments. This course examines basic topics and concepts, including archaeological site formation, paleo-environmental reconstruction, raw materials and resources, soil science, deposition and erosion of wind and water-borne sediments in different environments such as along rivers, lakes and coastlines, radiocarbon and other chronometric dating methods, and ground-based remote sensing, including ground penetrating radar.

AS.130.420. Seminar in Research Methods in Near Eastern Studies. 3 Credits.
This writing intensive seminar examines the relationship between religion and science in ancient Mesopotamia and the rest of the Near East from the 4th millennium to the Hellenistic period. Using a variety of case studies, and through engagement with scholarly literature pertaining to the topic of the course, students will develop skills in specific research skills such as critical reading, analysis, and interpretation. Area: Writing Intensive
AS.131.678. Geoarchaeology: Applications of Earth Science to Archaeology.
Geoarchaeology is a multidisciplinary subfield that applies the tools and techniques of earth science to understand ancient humans and their interactions with environments. This course examines basic topics and concepts, including archaeological site formation, paleoenvironmental reconstruction, raw materials and resources, soil science, deposition and erosion of wind and water-borne sediments in different environments such as along rivers, lakes and coastlines, radiocarbon and other chronometric dating methods, and ground-based remote sensing, including ground penetrating radar.

Area: Writing Intensive

Program in Museums and Society
AS.389.201. Introduction to the Museum: Past and Present. 3 Credits.
This course surveys museums, from their origins to their most contemporary forms, in the context of broader historical, intellectual, and cultural trends including the social movements of the 20th century. Anthropology, art, history, and science museums are considered. Crosslisted with Archaeology, History, History of Art, International Studies and Medicine, Science & Humanities.

AS.389.260. Cultural Heritage in Crisis. 3 Credits.
We explore the possible futures of cultural heritage and museums in times of accelerating climate change, pandemics, armed conflict and political and social turmoil by examining past and contemporary events.

AS.389.303. World of Things. 3 Credits.
The course introduces and applies new concepts about materials, and materiality to museum objects. It treats the museum as a site for investigating the relationship between people and things.

AS.389.315. Ancient Color: The Technologies and Meanings of Color in Antiquity. 3 Credits.
What role did the colorful surfaces of sculptures, vessels and textiles play in the ancient world? We examine historical texts and recent scholarly and scientific publications on the technologies and meanings of color in antiquity, and use imaging and analytical techniques to study polychromed objects from the Johns Hopkins Archaeological Museum.

AS.389.322. Tigers to Teapots: Collecting, Cataloging, and Hoarding in America. 3 Credits.
Course will examine the collecting behavior of Americans. Students will explore how collectors have defined the holdings of the nation's museums, galleries, and libraries and used objects to shape taste and status in the U.S.

AS.389.340. Critical Issues in Art Conservation. 3 Credits.
The course examines recent controversies in the conservation of major global art works and sites, raising questions concerning the basic theoretical assumptions, practical methods and ethical implications of art conservation. Cross-Listed with History of Art and Anthropology.

AS.389.373. Encountering American Art. 4 Credits.
Students investigate the Baltimore Museum of Art's American art collection and its presentation to the public alongside current scholarship on American art to develop strategies for a new permanent collection display that aligns with the museum's commitment to artistic excellence and social equity. M&S Practicum. Co-taught with BMA curator Virginia Anderson.

AS.389.384. Object Encounters at the Baltimore Museum of Art. 3 Credits.
Using the Baltimore Museum of Art as a laboratory, students examine canonical narratives in art museums and iterate new approaches to objects in museums that build equity, interrogate privilege, decolonise, revisionise and offer alternative stories. Class meets at the museum every other week.

AS.389.405. Visualizing Africa. 3 Credits.
Examines the history of African art in the Euro-American world, focusing on the ways that Western institutions have used African artworks to construct narratives about Africa and its billion residents. Area: Writing Intensive

AS.389.420. Curatorial Seminar. 4 Credits.
In collaboration with a local museum, conceptualize and develop an exhibition, potentially including but not limited to: checklists, exhibition texts, interpretive strategies, and programming. Exhibition theme varies year to year. Concepts, ethics and practicalities of curation are key concerns. Research visits to regional museums and private collections as relevant. Area: Writing Intensive

Research Methods
SA.100.412. Quantitative Research Methods. 4 Credits.
...forthcoming!

Security, Strategy, and Statecraft
SA.500.502. Genocide and Mass Violence. 2 Credits.
Genocide is often described as the worst of crimes, the nadir of human behavior, and the world's most "odious scourge." The goal of this course is to examine the origins and causes of genocide and to introduce students to the key works and major debates in the growing field of genocide and mass violence research. This course is divided into three parts. First, we will discuss how genocide is conceptualized and defined, explore the theories that try to explain why genocides occur, and discuss why people may participate in genocidal killing. In the second part we will examine several key case studies of genocide and mass violence. Third, we will complete the course by debating policy approaches to genocide and mass violence including prevention, intervention, post-genocide justice, reconciliation and memory.

SA.502.126. Strategy And Policy. 4 Credits.
Provides an overview of strategic studies, which deals with the preparation and use of military power to serve the ends of politics. Discusses the development of warfare from the mid-19th century through the present and addresses major theoretical concepts, including those found in Carl von Clausewitz's On War. Students may not register for this class if they have already received credit for SA.660.740[C]

SA.502.145. Genocide and Mass Violence. 4 Credits.
Genocide is often described as the worst of crimes, the nadir of human behavior, and the world's most "odious scourge." The goal of this course is to examine the origins and causes of genocide and to introduce students to the key works and major debates in the growing field of genocide and mass violence research. This course is divided into three parts. First, we will discuss how genocide is conceptualized and defined, explore the theories that try to explain why genocides occur, and discuss why people may participate in genocidal killing. In the second part we will examine several key case studies of genocide and mass violence. Third, we will complete the course by debating policy approaches to genocide and mass violence including prevention, intervention, post-genocide justice, reconciliation and memory.
SA.502.148. History of European Integration. 4 Credits.
This course is concerned with the historical process by which European nations-states have constructed the institution known as the European Union (EU). It deals primarily with political, diplomatic, and economic history, not legal history or the history of European public policy. By the end of the course, students will have a clear picture of principal forces that have driven European integration at the various stages in the 'European Project's' development.

SA.502.149. The Indo-Pacific: cooperation & contestation. 4 Credits.
The Indo-Pacific has developed into a new framework for regional cooperation and contestation between the major powers, replacing the earlier notion of the Asia-Pacific. It reflects the rise of China and its Belt and Road Initiative, which aspires to weld together the Eurasian landmass and its adjacent areas in a two-pronged, transcontinental and maritime drive. This course explores the material foundations, the perspectives and strategies of the major players in this huge maritime area, the patterns of cooperation and conflict in their interactions and the arrangements - and their deficiencies - for transregional international order.

SA.502.150. Transatlantic Security. 4 Credits.
forthcoming!

States, Markets, and Institutions
SA.503.110. Soft Power and Global Politics. 4 Credits.
As the use of military force to resolve disputes between nations becomes less plausible in most regions of the world, the struggle for influence intensifies. Among the results has been the rise to global fame of the concept of 'Soft Power', in theory a means to turn a country's attributes and achievements into a lever for gaining advantage in international competitions of all sorts. Google lists 176m references to the term (11/1/13), China has invested in it heavily and consciously. Even nations such as Russia and Iran are using soft power language and tools. During the Syrian crisis, the term was everywhere. But the course will suggest that the land which gave birth to the term - the US - is still the one which enjoys the greatest advantages in this contest, since the most significant form of soft power leverage over time is the one which most successfully proposes models of modernity. No matter how much weaker the appeal of America's military, its banks, its politics compared to their heyday, America's products, icons, technologies, universities, media industries, personalities, etc. can still produce forms of presence and innovation which the rest of the world must reckon with. The course offers an historical perspective on this dynamic. Specifically it focuses on the great variety of models of modernity the US has produced over time and still can, and how the world has come to terms with them (including militant rejection). The course in its early stages is European in focus. Soon it opens out to other regions of the globe, especially Asia. So often the imperative of innovation that the US brings has encountered waves of anxiety about relations between the state and its citizens, between national communities and the market, between generations, genders, ethnic groups and religions. Efforts to understand 'soft power' and the outcomes of the world's encounter with the American version: these are the central issues of the course.

SA.503.111. Political Systems of the Developing World. 4 Credits.
The course is meant to prepare the students to deal with the most important theoretical and substantive issues affecting the nature, functioning and transformation of the political systems of the developing world. It will be focused on the analysis of the most relevant regime-types: authoritarian, military, theocratic, and democratic, and of major political processes such as political development and social modernization, state-building and state failures, political transitions and democratic consolidations. It will draw from a wide range of cross-national and cross-regional cases. Class time will be divided between lectures and discussion. Each topic will be introduced by the instructor. The readings constitute the background for each lecture, but we will build upon them and go well beyond. Occasionally, timely articles on especially significant events will be analyzed in depth. Hopefully, fertile discussions will follow on the assumption that all students have done their reading. The course will end with a take-home exam.

SA.503.112. After Afghanistan - Any Future for Peace Operations, Peacebuilding & Peacebuilding. 4 Credits.
In August 2021 the international media and most politicians reacted with much surprise to the dramatic events at Kabul airport. Thousands of Afghanis, desperate to flee the Taliban rule, were struggling to get on the last planes leaving the country. It did not take long before prominent Western commentators proclaimed that the failure in Afghanistan would be the end of long-standing, Western inspired conflict management strategies to end violent conflict in failing states by deploying peace operations and getting involved in long-term peace- and nation building processes. Indeed, “peace operations”, conducted by a variety of international actors like the UN, EU, NATO, AU, are a strategic pillar of international peace and security policy since the end of the Cold War. In average, more than 150,000 international military, police, and civilians are annually deployed worldwide. No doubt, a number of these missions are struggling with difficulties similar to those in Afghanistan. But does the failure in Afghanistan really imply that there is no future for peace operations and peacebuilding and that missions like those in Mali, Somalia, DR Congo etc. will suffer a fate similar to that in Afghanistan? This is what we want to explore in the class by having a thorough, field-based look at the history, concepts, development and unsolved problems of UN-lead peace operations and peacebuilding.
Civil Wars and Interventions. 4 Credits.
The course aims to discuss key concepts and analytical framework for analyzing the various phases and facets of intra-state wars, and to show how international interventions can affect the course of these conflict and peace processes. In order to do so, the course first analyzes the causes of civil wars and other major episodes of collective violence, the dynamics of violence in these conflicts, and early warnings measures that allow to predict the onset of conflict. It then examines the different ways in which external/international actors can intervene in domestic conflict, management techniques that may be introduced at various stages of conflict to halt escalation, minimize violence, and to move conflicts toward a sustainable peaceful settlement. This includes an analysis of peacekeeping, peacebuilding and state-building practices, and transitional justice. The course provides students with an advanced understanding of the thriving literature on civil wars and interventions, looking at both qualitative and quantitative scholarship, and offers students the possibility to engage with case studies to explore the real-world conflicts from their origin to their solution. In particular, the course offers detailed treatment of conflicts across continents, such as the wars in Bosnia, Colombia, Sahel region and Syria. Each case study will cover different aspects of the conflict, from their onset to evolution and the role of external actors. The expected outcome is that students will be able to engage with both academic and policy relevant literature in their quest for gaining a better understanding of the conflict cycle.

Constitutional Development and Democratization. 4 Credits.
The spread of human rights and constitutional, representative government based on the rule of law, as either spurs for development or desirable outcomes of development, seems both possible and urgently necessary and yet we appear to be in a phase where many countries are undergoing a democratic retrogression. This course examines the nature, fate and prospects for constitutional development and democratization across the globe. Employing both the diachronic and synchronic methods of analysis typical of comparative constitutional law, the course addresses topics such as constitution-making and constitutional amendment; forms of state and forms of government as well as the role and functions of constitutional and supreme courts with the aim of understanding how a given institutional framework may facilitate or obstruct transitions to democracy. The experience of so-called ‘consolidated’ democracies will often be used to examine the transition to democracy of other countries.

Law and Institutions of the European Union. 4 Credits.
The spread of human rights and constitutional, representative government based on the rule of law, as either spurs for development or desirable outcomes of development, seems both possible and urgently necessary and yet we appear to be in a phase where many countries are undergoing a democratic retrogression. This course examines the nature, fate and prospects for constitutional development and democratization across the globe. Employing both the diachronic and synchronic methods of analysis typical of comparative constitutional law, the course addresses topics such as constitution-making and constitutional amendment; forms of state and forms of government as well as the role and functions of constitutional and supreme courts with the aim of understanding how a given institutional framework may facilitate or obstruct transitions to democracy. The experience of so-called ‘consolidated’ democracies will often be used to examine the transition to democracy of other countries.

Great Powers. 4 Credits.
The course aims to discuss key concepts and analytical framework for analyzing the various phases and facets of intra-state wars, and to show how international interventions can affect the course of these conflict and peace processes. In order to do so, the course first analyzes the causes of civil wars and other major episodes of collective violence, the dynamics of violence in these conflicts, and early warnings measures that allow to predict the onset of conflict. It then examines the different ways in which external/international actors can intervene in domestic conflict, management techniques that may be introduced at various stages of conflict to halt escalation, minimize violence, and to move conflicts toward a sustainable peaceful settlement. This includes an analysis of peacekeeping, peacebuilding and state-building practices, and transitional justice. The course provides students with an advanced understanding of the thriving literature on civil wars and interventions, looking at both qualitative and quantitative scholarship, and offers students the possibility to engage with case studies to explore the real-world conflicts from their origin to their solution. In particular, the course offers detailed treatment of conflicts across continents, such as the wars in Bosnia, Colombia, Sahel region and Syria. Each case study will cover different aspects of the conflict, from their onset to evolution and the role of external actors. The expected outcome is that students will be able to engage with both academic and policy relevant literature in their quest for gaining a better understanding of the conflict cycle.

Integrating Humans and Technology. 3 Credits.
This class provides a hands-on introduction to human and cognitive systems engineering. Students will learn and apply user-centered research and innovation methods that are used to discover, document and integrate human capabilities, limitations and needs into the systems engineering process, improving the likelihood that the resulting systems are intuitive, efficient, effective and useful. Topics include needs elicitation, workflow analysis, functional allocation, decision making, prototyping, and performance measurement.

Introduction to Systems Engineering OR EN.675.600 Systems Engineering for Space

Transnational Advocacy. 4 Credits.
The class will examine theories and practices of international advocacy. Students will examine different types of advocacy: from insider lobbying to people powered campaigns, from agenda-setting to rapid response and digital campaigning. They will read academic scholarship on advocacy alongside texts produced by and/or for practitioners. The first half of the course will focus on theoretical dimensions of advocacy – who drives norm change and who resists it? When is advocacy effective? The second half of the course will focus more on advocacy for refugee and migrant rights. Students will evaluate a campaign for refugee and/or migrant rights and develop their own campaign recommendations. Learning Objectives: critically assess theories of international advocacy; identify and compare different types of advocacy organizations, strategies and tactics; develop practical skills in designing and evaluating campaigns.

Multiculturalism & the Human Rights of Women. 4 Credits.

The Middle East

Political Leadership in the Middle East. 4 Credits.
Change in the Middle East has often been attributed to charismatic and powerful leaders, whose influence has been magnified by crisis, wars, and authoritarian traditions. This course combines biography with politics to ask whether, how, and in which circumstances, individual leaders have changed the course of modern Middle Eastern history. Special attention is paid to the interaction of leaders and mass movements, and leadership dynamics in the unfolding “Arab Spring.”

History and Politics of the Middle East & North Africa. 4 Credits.
The course aims at introducing students to the history and politics of the Middle East and North Africa (MENA), with a focus on the Mediterranean Middle East/Mashreq and Maghreb. Starting with the exploration of the emergence of the modern state system in the region, the course will examine the post-colonial politics of MENA countries and the current state of affairs. In this context, a number of key issues will be addressed, such as state-society relations, authoritarianism and reform, the role of the military, regional dynamics, conflicts, the strategic importance of the region, political Islam, and democracy and human rights. The course will conclude with a discussion of the Arab uprisings and their outcome, along with the implications for the politics and international relations of the MENA region.

For current faculty and contact information go to http://www.jhu.edu/artwork/faculty.htm