**ARTS**

**ART-SHU 255 *Printmak. in an Expanded Field.*** Printmaking in China has a long and varied history. Originally, stamps and official seals were carved out of stone, jade, and other hard materials. Eventually, softer wood was used as it was vastly easier to carve and more economical, thus establishing a tradition of Chinese relief printing on a vast scale. Despite originating in China, wood block prints are more often associated with Japan due, in part, to preferences held in the “eye of the beholder” rather than for any innate technical or artistic merit. In this comparative course students will consider complex issues such as appropriation versus translation; authenticity; and artistic cultural identity and ownership as they relate to art making and exhibition practices around the globe. Students will learn techniques, modes, forms, and applications of printmaking – monotypes (transfers and rubbings), relief prints (stamps and wood cuts), intaglio (dry point engraving), stencils, and mixed media technique – in a conceptual framework of global visual culture. Students will also engage in selected readings to ground their visual pursuits in an historical and classical understanding as well as a theoretical, critical and contemporary context. Through a semester-long research project, they will be challenged to critically examine their own work in a contemporary global context. Course fees: $70.00 per student Prerequisite: none

**ART-SHU 302T *Topics in Art: Photography II*.** Photography II is a praxis course that provides students with a critical examination of photography as a medium-specific discipline. Through the investigation of the intersection between photography and sculpture, the course will explore the materiality, physicality, and spatiality of the photographic object.

**ART-SHU 307T *Moving Images II.*** Moving Images II is a praxis course that provides students with a critical examination of moving image practices as a medium-specific discipline at the intersection of Visual Art and Experimental Film/ Avant-garde Cinema. Using Gilles Deleuze’s Cinema 1 The Movement-Image as a theoretical foundation, the course examines the mobile camera and montage as two essential kinetic elements of time-based media.

**ART-SHU 629 *The Villain.*** What makes a villain and who decides? In this course, we will track the evolution of the villain across the globe and through the ages, exploring representations of evil in myth, literature, and art history, as well as on the stage and screen. We’ll identify the origins of iconic imagery and characteristics, interrogate the scapegoating of certain characters or populations, and question our own perceptions of villainy. Our material will include sacred text, Shakespeare, Japanese Noh, political documents, psychological studies, horror films of early cinema, and relevant works of today from Disney to Black Panther. Assignments will take the form of textual analysis and research, as well as artistic responses in the form of performance, music, photography, and video, all seeking to understand new perspectives on those we label “villain.” Pre-requisites: None

**BIOLOGY**

**BIOL-SHU 21 *Foundations of Biology I.***  This course satisfies part of the Foundations of Science core, DS Genomics concentration; satisfies ED Core Requirement.

**BIOL-SHU 250 *Organismal System****s.* The array of organisms that populates the globe is astounding in its diversity and adaptability. This course uses fundamental concepts from the Foundations of Science curriculum to examine essential elements of animal physiology, including adaptations to environments such as deserts. This course develops an understanding of the relationship between structure and function of the organism; how structure develops through evolutionary and developmental processes; and how structure is related to the environment surrounding the organism. Prerequisite CCSC-SHU 114 or BIOL-SHU 21.

**BIOL-SHU 271 *Cell bio:Body's battle cancer*.** This course is designed to provide comprehensive understanding of how cancer breaks our body's defense for its survival. Cancer is a devastating disease in a modern society and a plethora of efforts has been made to find its cure. In this course, students will learn how difficult fighting against cancer is in a molecular level. Furthermore, using cancer as an example, students will also learn how metazoan develops multiple defense mechanisms and survives in the hostile environment. Pre-requisite: Foundations of Biology I (BIOL-SHU 21)

**BUSINESS**

**BUSF-SHU 5 *Princ. of Finance (Non-majors).***  (for non-Business/non-Data Science B/F concentration majors)

**BUSF-SHU 142 *Info Tech in Business & Societ.***In Information Technology in Business and Society, students learn the fundamental concepts underlying current and future developments in computer-based information technology - including hardware, software, network and database-related technologies. They will also acquire proficiency in the essential tools used by today's knowledge workers and learn how these can be used to help solve problems of economic, social or personal nature. Throughout the course, they will be exposed to a range of more advanced topics which may include big data, information privacy, information security, digital piracy and digital music. Pre-requisites: None.

**BUSF-SHU 200B *Topics in Business.*** The course enables students to apply tools and skills, learned in this and previous business courses, by undertaking projects focused on real business cases and provided by real companies. The cases are supplied by organizations expressly for this course and concern real opportunities and challenges facing them. Students will participate on teams of 4-5 people. Each team will have a different project. They will meet the organization for which they are undertaking the project to get insights into the problem being addressed and to present their results in the end. They will also meet regularly with the professor who will give lectures on problem-solving tools and skills as well act as a mentor when the projects are undertaken. They will also meet with outside mentors, brought in from the business world to review and offer comments / suggestions.

**BUSF-SHU 200D *Business Consulting in China.*** This course provides a consultant’s perspective on business consulting, particularly in China context. It introduces the principles, end-to-end processes, frameworks and best practices of business consulting. The course addresses how consulting firms work, what it is like working in a consulting firm and being on a consulting project. Students will form project teams and apply the principles and frameworks to real-life business consulting projects from mid-small companies in China. Prerequisites: Management and Organizations and/or Intro to Marketing, or upon approval by the instructor; requires Junior or Senior standing.

**BUSF-SHU 206 *Investing & Financing in China.*** What does it take to be successful in China? How do domestic and foreign businesses do in the world's most dynamic economy? How do Chinese entrepreneurs work in a dynamic country? How do investors think about cross border investing into and out of China? How do investors think about cross border investing into and out of China? What are the leading opportunities in Chinese markets today? How are Chinese firms reshaping global business? Course overview This course is designed to prepare students for a good overview of investments, financing as well as conducting business in and with China. The class format will include lectures, case studies, discussions, guest speakers and student presentations to explore the opportunities and risks of international and domestic investments in China as well and the outward expansion of Chinese firms. The course will be require the student's active participation and parts will involve group work. Leading industry guest speakers and a site tour may be arranged for further learning enhancement, schedules permitting. The course materials will draw heavily on the lecturer's experiences. Target students / audience The target students are NYU Shanghai business & finance majors, economics majors and study abroad students from Stern. This course is suitable for any student interested in understanding international business, emerging markets, investments,cross border business and China. No prior knowledge or experience with China's business environment is required. Prerequisites: Foundations of Finance, Corporate Finance and Economics of Global Business (or Macroeconomics)

**BUSF-SHU 209T *Senior Theses on Case Analysis.***

**BUSF-SHU 222 *Risk Mgmt in Financial Institutions.*** This course examines the management of risks in a wide range of financial activities, with a particular focus on market risk, credit risk, and liquidity risk. It uses quantitative models to estimate credit losses, economic capital and value at risk, and to perform stress tests and scenario analysis. The course also analyzes the consequences of technological change, globalization, monetary policy, and the entry of new types of institutions into existing financial markets. It emphasizes the importance of systemic risk, moral hazard, and new regulations in light of the recent financial crisis.

**BUSF-SHU 229 *Behavioral Finance.*** This course uses human psychology and market frictions to shed light on asset returns, corporate finance patterns, and various Wall Street institutional practices. It starts with motivating evidence of return predictability in stock, bond, foreign exchange, and other markets. The course then proceeds to themes including the role of arbitrageurs in financial markets, the psychological and judgmental biases of average investors, and the financing patterns (such as capital structure and dividend policies) of firms that raise capital in inefficient securities markets and/or are led by irrational managers. Pre-requisites: Corporate Finance

**BUSF-SHU 244 *Portfolio Management.*** Portfolio management: The art and science of making decisions about investment mix and policy, matching investments to objectives, asset allocation for individuals and institutions, and balancing risk against performance. (Investopedia) The primary objective of the course is to study the theory and empirical evidence relevant for investing, particularly in the context of portfolio management. The basic theoretical framework is standard modern portfolio theory, as developed in Foundations of Finance, and its extensions. “Modern portfolio theory” is a general approach for maximizing the expected return of a portfolio given a certain amount of risk. This approach is the basis of virtually all quant investing strategies and is widely used by traditional portfolio managers as well. There has been a proliferation of new products and strategies in the asset management space in recent years, e.g., smart beta, alternative beta, fundamental indexing, low volatility, and leveraged and inverse ETFs. This course applies portfolio theory to understand and evaluate these products and strategies in the context of the empirical evidence about return patterns across assets (i.e., the factors such as value/growth, momentum, and carry that drive returns) in multiple markets/asset classes (e.g., US and international equities and bonds, currencies, and commodities). Key questions include: • What factors drive asset returns? Is it risk or mispricing? • Can this structure of returns be used to construct better portfolios and products? • How should the performance of existing products be evaluated given the empirical evidence? The course will rely heavily on Excel modeling using real world data. The course also covers, to a lesser extent, the institutional landscape of the asset management business—the firms (e.g., Blackrock, Vanguard), the vehicles (e.g., mutual funds, ETFs, hedge funds), and the trends (e.g., active vs. passive, fee competition). Prerequisite: Foundations of Finance

**BUSF-SHU 250 *Principles of Financial Accounting.*** Develops students’ abilities to understand business transactions and financial statements and to determine the most appropriate financial measures for these events. Investigates the underlying rationale for accounting practices and assesses their effectiveness in providing useful information for decision making. Emphasis is placed on accounting practices that purport to portray corporate financial position, operating results, cash flows, manager performance, and financial strength. Prerequisite: Not open to freshmen.

**BUSF-SHU 270 *Financial Reporting & Disclosure***. The prerequisite for this course is ACCT-UB 3, Financial Statement Analysis. Students learn the financial reporting rules associated with the concepts learned in FSA. The course emphasizes the relationship between financial statements and the reporting rules on which they are based. Prerequisite: Principles of Financial Accounting

**BUSF-SHU 271 *Artificial Intelligence for Business.***Artificial Intelligence (AI) is reshaping business processes, creating disruptive innovations that change established industries and markets beyond recognition. The emergence of powerful algorithms, combined with recent growth in computational power and availability of massive amounts of data, enable companies to operate faster, make better decisions, automate processes, maximize revenue and customer engagement, among many other advantages. In this 7-week course we will briefly discuss some of the core principles underlying AI and then focus on a few selected applications of AI in business, such as predictive analytics for maximizing marketing and financial strategies, pattern recognition to understand customer behavior, and conversational AI and chatbots to improve engagement and customer experience. Last, AI also possesses significant limitations and poses new challenges with respect to fairness, biases, and automated errors. The course will conclude with a discussion of the main ethical issues and risks associated with AI technology. Prerequisite: Calculus and ICP. No freshmen.

**BUSF-SHU 288 *Doing Business with China.*** The course is designed to help the students to better understand business practices, environment, and cultures in China. Special focus will be placed on the understanding of the political, institutional, and financial contexts within which business activities unfold. The course will also discuss the implications of regional and global factors in shaping opportunities and constraints on businesses in China as well as the impact of Chinese business on international markets. Learning goals of the course are to: 1. Become knowledgeable in select concepts of the businesses in China; 2. Obtain essential knowledge on the evolution and development of business in China; 3. Develop an awareness of the political, socioeconomic, and cultural aspects of life in China, including critiques of common intercultural stereotypes around values and assumptions related to Chinese society and business practices; 4. Gain practical experience in interacting with diverse Chinese business communities.

**BUSF-SHU 303 *Corporate Finance.*** This course analyzes the major financial decisions made by corporate managers. The major topics include the objective of the firm, investment valuation and capital budgeting, risk management, capital structure and dividend policy. Insights from behavioral corporate finance that help better understand corporate decisions in practice will also be discussed. There will be emphasis on both developing the tools and mindset of the financial practitioner as well as examining specific applications in the form of examples, case discussions, and classroom simulations. Prerequisite: BUSF-SHU 202

**BUSF-SHU *309 Financial Statement Analysis.*** The course analyzes how firms communicate through financial statements. Students use financial statement analysis as an integral part of the strategic analysis of firms, while understanding how accounting regulations and managerial discretion influence presented financial statements. Course modules include strategic analysis, risk and profitability analysis using ratios, accounting analysis, and prospective analysis. By the end of the course, students can interpret and analyze financial statements, analyze cash flows, make judgments about earnings quality, uncover hidden assets and liabilities, and use financial statement analysis prospectively to forecast and value firms using cash flow-based and accounting-based valuation methods. Students who wish to pursue careers in investment banking, investment management, consulting, and accounting are encouraged to take the course.

**BUSF-SHU 311 *New Venture Strategy.*** This course introduces students to a new class of decision-making framework and tools for optimizing the most critical strategic choices faced by new ventures. The major topics include (1) identify and choose between alternative opportunities, (2) choose between different markets, technologies and business models, (3) formulate commercialization strategies, (4) evaluate the financial attractiveness of a business opportunity and different deal structures, and (5) form and manage diverse teams. This course will consist of theory-based lectures, case discussions, and guest presentations. It is suitable for students interested in founding or working in start-ups, as well as in related careers such as consulting and venture investing.

**BUSF-SHU 321 *Equity Valuation.*** This course covers the valuation of stocks and businesses. Real life valuations of companies are an inherent part of the content. By the end of the course, students should be able to: (1) apply discounted cash flow analysis to find the intrinsic value of an asset; (2) define, describe, analyze, and apply any multiple (PE, Value/EBITDA, Price/Book Value, etc.) to find the relative value of an asset; (3) value any publicly traded firm, small or large, domestic or foreign, healthy or troubled; (4) value any private business for owners or investors (private equity, venture capital, IPO); and (5) separate fact from fiction, sense from nonsense, and real analysis from sales pitch in equity research reports, valuations, and general discourse. Prerequisites: Foundations of Finance AND Corporate Finance.

**BUSF-SHU 334 *Advanced Futures and Options.*** This course consists of three parts. The first section of the course is a detailed examination of the pricing and hedging of option contracts, with particular emphasis on the application of these concepts to the design of derivatives instruments and trading strategies. The first part of this section is a review and re-examination of materials covered in the basic course, but with greater rigor and depth of coverage. The emphasis in the second part of this first section is on trading applications and risk management. The second section of the course is designed to provide a broad exposure to the subject of interest rate derivative products, both swaps and options. The last section of the course deals with recent innovations in the derivatives markets such as exotic options, credit derivatives and catastrophe derivatives. In the first section of the course, the discussion of trading strategies is in the context of the management of the risk of a derivatives book. The topics covered in the second part of the course include the relationship of swaps to other fixed income contracts such as futures contracts and forward rate agreements, valuation and hedging of swaps, building the yield curve, and valuation and hedging of interest rate options, with particular reference to caps, floors and swaptions, and modeling the term structure of interest rates. The third section of the course deals with non-standard option contracts such as exotic options and options on new underlying instruments such as credit, weather and insurance derivatives. Pre-requisite: Foundations of Finance.

**EXPER DISCOVERY IN NAT WORLD**

**CCEX-SHU 136 *Human Genetics: Genes in Human Health & Disease.*** The goal of the first half of the course is to build a basic understanding of how information about traits is encoded in our genes, how this "blueprint" is interpreted by cellular machinery to build a complex human being, and how our heredity has resulted in our evolution. In the senond half of the course, we will continue the exploration of how environment, experience and random errors affect the process of building our traits, what happens when these processes fail, and the promise and possible peril of genetic technologies for human life.

**CORE SCIENCE**

**CCST-SHU 133 *Wat er Energy Food Nexus.*** Billions of people on earth lack adequate access to water, food, and energy. What might be gained by recognizing the interdependencies that exist between these resources? It is well known that water is fundamental to agriculture and to the entire agro-food supply chain. Moreover, it is clear that energy is required to produce and distribute water and food: to pump water, to power irrigation machinery, and to process and transport agricultural goods. But a global society requires industry and policymakers to take even broader views. For instance, how are water security, energy security, and food security linked, so that actions in one area will likely have impacts in one or both of the others? How will population growth, economic development, and climate change affect international efforts to eradicate poverty? Additionally, what roles might renewable energy technologies play in providing access to cost-effective, secure, and sustainable energy supplies? Students will approach these questions through multidisciplinary lenses and cultivate the skills required to address the social, economic, and environmental challenges posed by the water-energy-food nexus.

**CHEMISTRY**

**CHEM-SHU 126 *Foundations of Chemistry II.*** This course is a continuation of Foundations of Chemistry I. Topics covered include the theories of intermolecular interactions, molecular orbital theory, reaction kinetics, chemical equilibria, acid-base reactions, properties of solutions, properties of solids, phase changes, transition-metal chemistry, coordination chemistry, electrochemistry, and nuclear chemistry. Students will reinforce and refine their physical and chemical intuition with a problems-based approach. pre-req: CHEM-SHU 125 Foundations of Chemistry I AND pre-req or co-req: MATH-SHU 121 Calculus or MATH-SHU 201 Honors Calculus.

**CHEM-SHU 226 *Organic Chemistry II.*** This is a continuation of the course Organic Chemistry I, directing to the same objectives: An introduction to the world of Organic Chemistry; learning the main classes of compounds, their structure, nomenclature, reactivity and reactions. Students who complete the course should be able to understand the symbolism used in organic chemistry, the three-dimensional structure of organic molecules, and how that influences organic reactions. Students should be able to reproduce reaction mechanisms and relate those to compounds and reactions they have not encountered. Students should be able to predict the major product of simple reactions on organic compounds containing only one functional group and apply those same principles to more complex compounds containing multiple functional groups. Students should be able to design simple organic syntheses. Students should be able to read and comprehend articles from the current literature. Prerequisite: CHEM-SHU 201(225). This course satisfies: Chemistry Major: Additional Required Courses.

**CHEM-SHU 882 *Biochemistry II.*** Building on the lessons of Biochemistry 1, Biochemistry 2 emphasizes analysis of basic metabolic pathways, including glycolysis, electron transport, and oxidative phosphorylation, as well as mechanisms of metabolic regulation and integration. Prerequisite CHEM-281.

**COMPUTER SCIENCE**

**CSCI-SHU 188 *Introduction to Computer Music.*** Computers are used to process signals, compose music, and perform with humans. Personal computers have replaced studios full of sound recording and processing equipment, completing a revolution that began with recording and electronics. In this course, students will learn the fundamentals of digital audio, basic sound synthesis algorithms, techniques for human-computer music interaction, and machine learning algorithms for media generation. In a final project, students will demonstrate their mastery of tools and techniques through a publicly performed music composition. Prerequisites:ICP OR ICS (best to have some experience in Music, or check with the instructor before enrolling)

**CSCI-SHU 210 *Data Structures.*** Data structures are fundamental programming constructs which organize information in computer memory to solve challenging real-world problems. Data structures such as stacks, queues, linked lists, and binary trees, therefore constitute building blocks that can be reused, extended, and combined in order to make powerful programs. This course teaches how to implement them in a high-level language, how to analyze their effect on algorithm efficiency, and how to modify them to write computer programs that solve complex problems in a most efficient way. Programming assignments. Prerequisite: ICS or A- in ICP. Equivalency: This course counts for CSCI-UA 102 Data Structures (NY). This course satisfies: Core Curriculum: Programming and Computational Thinking; Major: CS Required, Data Science Required, CE Required.

**CSCI-SHU 213 *Databases.*** The course covers modeling an application and logical database design, the relational model and relational data definition and data manipulation languages, design of relational databases and normalization theory, physical database design, query processing and optimization, transaction processing focusing on concurrency and recovery. The labs emphasize experiential learning of database systems and applications and an insight into various database management systems and query languages.

**CSCI-SHU 220 *Algorithms.*** Introduction to the study of algorithms. Presents two main themes: designing appropriate data structures and analyzing the efficiency of the algorithms that use them. Algorithms studied include sorting, searching, graph algorithms, and maintaining dynamic data structures. Homework assignments, not necessarily involving programming. Prerequisites:Data Structures and Discrete Math and Calculus. This course satisfies: Major: NS Electives, CS Required, Data Science Concentration in Computer Science.

**CSCI-SHU 254 *Distributed Systems.*** This course offers a solid grounding in the basic issues and techniques of parallel and distributed computing. The material covers the spectrum from theoretical models of parallel and distributed systems to actual programming assignments. Pre-requisite: Data Structures and Operating Systems.

**CSCI-SHU 308 *Computer Networking.*** This course takes a top-down approach to computer networking. After an overview of computer networks and the Internet, the course covers the application layer, transport layer, network layer and link layers. Topics at the application layer include client-server architectures, P2P architectures, DNS and HTTP and Web applications. Topics at the transport layer include multiplexing, connectionless transport and UDP, principles or reliable data transfer, connection-oriented transport and TCP and TCP congestion control. Topics at the network layer include forwarding, router architecture, the IP protocol and routing protocols including OSPF and BGP. Topics at the link layer include multiple-access protocols, ALOHA, CSMA/CD, Ethernet, CSMA/CA, wireless 802.11 networks and link layer switches. The course includes simple quantitative delay and throughput modeling, socket programming and network application development and Ethereal labs. Prerequisite: CSCI-101 or placement test. This course satisfies: Major: CS Electives, EE Additional Electives.

**CSCI-SHU 311 *Functional Programming.*** Functional Programming is a very powerful and expressive style of programming which has become extremely popular in the recent years, both in academia and in the software industry. There are good reasons for this success: functional programs are modular by design, and interact through expressive and cleanly specified interfaces, using static typing and pattern matching. As a result, functional programs are generally simpler to reason about, to maintain and to execute in parallel than imperative or object-oriented programs. The purpose of the course will be to provide an advanced introduction to Haskell, a purely functional language used today in the software industry for real-world applications. The language comes with a rigorous semantics and everything one could expect of a functional programming language: static type inference, lazy evaluation, type classes, explicit handling of effects using monads, and concurrency primitives and abstractions. We will take the opportunity of this course on Haskell to cover elements of formal language theory, with the implementation in Haskell of a parser, pretty-printer and interpreter for a small imperative language. Prereq: CSCI-SHU 2314 Discrete Math and CSCI-SHU 210 Data Structures

**CSCI-SHU 350 *Embedded Computer Systems.*** An embedded system is a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. Embedded systems control many devices in common use today. Topics covered include microcontroller architecture, assembler programming, interrupts, peripheral interfacing, embedded system design, higher-level languages on embedded Systems, as well as a brief introduction to real-time operating systems. Practical Lab Exercises complement the lectures. The students will further specialize and consolidate their knowledge through semester-long hands-on projects. Prerequisite: ( CSCI-SHU 11 or CSCI-SHU 101 )AND CENG-202 or CENG-SHU 201. This course satisfies: Major: CE Required, EE Additional Electives.

**ECONOMICS**

**ECON-SHU 202 *Intermediate Macroeconomics.*** The course will cover a broad range of topics in macroeconomic theory, empirics and policy. Among the issues to be discussed are the business cycle theory, economic crises, economic growth, IS-LM model, open economy, inflation and unemployment, dynamic model of aggregate demand and supply, stabilization policy, government debt and budget deficits, money supply, central banking. The banking system: competition and stability, banking growth nexus, prudential regulation and the role of the financial sector in the macroeconomics model. Prerequisites: ECON-1 or Economics of Global Business (ECON major).

**ECON-SHU 210 *Market Design | Topics in Economics: Market Design.*** The course is about design of markets, not only in the sense of auctions and matching markets, but also in the broader sense of designing allocation rules in general. We aim to understand why some markets needs to be designed, and what important design elements are. This is particularly relevant for the digital economy where market design is often programed into smart contracts, and market participants may be computational agents. The course includes a series of assignments that builds towards writing a short research paper for the course. The topic of the research paper should be related to the material presented in the course, but must go into more depth with selected issues.

**ECON-SHU 301 *Econometrics.*** The course examines a number of important areas of econometrics. The topics covered include regression analysis with cross-sectional data; classical linear regression model and extensions; model specification, estimation and inference; regression with qualitative variables; heteroskedasticity and GLS; serial correlation and heteroskedasticity in time series regression. In addition to covering the relevant theoretical issues, the course includes the application of these methods to economic data. Prerequisite: Statistics (BUSF-SHU 101 OR MATH-SHU 235 OR MATH-SHU 233 OR ECON-UA 18 OR STAT-UB 103 OR STAT-UB 1 OR MATH-GA 2901 OR SOCSC-UH 1010Q OR ECON-UA 20).

**ECON-SHU 315 *Competitive Analysis.*** This course offers an economics approach to analyzing the way firms make marketing decisions and interact strategically with each other in the marketplace. The main goal of the course is to develop the basic intuition for pricing and other forms of strategic behavior on the part of firms. Pre-requisite: Principles of Microeconomics or Microeconomics.

**ECON-SHU 416 *Game Theory: Advanced Applications.*** This course introduces games of incomplete information and the applications. The first half of the course will review the basic theories, including normal form games, extensive form games, iterated dominance, and Nash equilibrium, with a focus on games with incomplete information. The second half will go through different topics and case studies of incomplete information, e.g. contract theory, auction, social learning, matching, etc. Students will acquire the basic concepts of these theories, and be able to model real-world situations with the language of game theory. Prerequisites: ECON-SHU 10 Intermediate Microeconomics (or students who took ECON-SHU 216, Introduction to Game Theory, may be admitted upon consulation with the instructor).

**ELECTRICAL ENGINEERING**

**EENG-SHU 251 *Circuits.*** This course covers Passive DC circuit elements, Kirchoff’s laws, electric power calculations, analysis of DC circuits, Nodal and Loop analysis techniques, voltage and current division, Thevenin’s and Norton’s theorems, and source-free and forced responses of RL, RC and RLC circuits. Prerequisite: MATH-121 or MATH- 201.

**EXPERIENTIAL LEARNING**

**EXLI-SHU 9302 *Experiential Learning.*** “Experiential Learning” is a 2-credit, Pass/Fail course that supports students in the Spring semester as they enter the workplace culture of the city through Community Placements which may include, but are not limited to, volunteer work, internships, or in some cases, independent research. Through class meetings, reflective writing, and individual conferences, faculty guide students to define an independent research project that grows out of the workplace experience, and which reflects a nuanced understanding of how the workplace culture relates to the social and cultural milieu of the city.

**FRENCH LANGUAGE**

**FREN-SHU 10 *Intensive Elementary French.*** Open to students with no previous training in French and to others on assignment by placement test. Completes the equivalent of a year's elementary level in one semester. Offered every semester. 6 points.

**FREN-SHU 20 *Intensive Intermediate French.*** Completes the equivalent of a year's intermediate level in one semester. Offered every semester. 6 points. PREREQS: Intensive Elementary French or Instructor Permission.

**FREN-SHU 30 *French Grammar and Composition.*** Systematizes and reinforces the language skills presented in earlier-level courses through an intensive review of grammar, written exercises, an introduction to composition, lexical enrichment, and literary analysis.

**HISTORY**

**HIST-SHU 110 U.S. *History through Literature and Film.*** his survey of U.S. History since the Civil War examines the development of American Culture and its expansion into the global economy. Topics include: urbanization; industrialization; immigration; reform movements (populism, progressivism, the New Deal, and the War on Poverty); and foreign policy. Beginning with the post-Civil War expansion of the U.S. into the American West, the course traces the U.S.’s increasing global influence through the early 21st Century. Using film, TV, literature and popular culture, the course emphasizes broad themes and changes in U.S. culture, politics, and society. Prerequisites: None.

**HIST-SHU 130 *Foundations: What is History.*** This course provides an introduction to a range of theoretical frameworks and methodologies that have influenced the academic study of history, including microhistory, global history, histories of gender and race, and subaltern/post-colonial historical studies. We will interrogate the key categories of historical temporality and geography by questioning how historians impose temporal and spatial boundaries around their research, as well as ways to expand or dissolve those boundaries. We will also examine how historians construct historiographical debates around particular research themes, such as the changing meaning of national histories. The aim is to acquire knowledge of a variety of historical approaches at work when reading both historical scholarship and historical source materials. Prerequisites: None.

**HIST-SHU 202T *Topics in History: Introduction to Asian American History.*** Satisfies HUMN Old: Survey, New: Introductory course.

**HIST-SHU 239 *New York: History of the City and its People.*** Examines key themes in the social history of New York City: the pattern of its physical and population growth, its social structure and class relations, ethnic and racial groups, municipal government and politics, family and work life, and institutions of social welfare and public order. Pre-requisites: None

**HUMANITIES**

**HUMN-SHU 206T *Topics in Humanities:International Cinema History After 1990.*** Arguably, there have been more—and greater—changes to every practice and institution of cinema since 1990 than in the 95 previous years of film history. Central to any examination would be the emergence of digital technology, which has transformed the production, distribution and exhibition of cinema. Yet other aesthetic, social and economic forces have also led to what seems to be an ongoing evolution of the medium. Using a broad range of examples from all over the world, this course will explore major developments in how films are made, and their impact on audiences. Topics will include postmodernism, changing notions of national cinema, contemporary uses of genre, and new forms of cinematic storytelling.

**HUMN-SHU *207 Bible As Literature.*** This course will serve as an introduction to literary approaches to the Bible. Using religious and critical approaches to the Bible as a backdrop, this course will explore what can be gained from focusing instead on what makes the Bible a great work of literature. Through close reading of biblical texts such as Genesis, Leviticus, Samuel, Esther, the Gospels, and poetic texts we will examine how a variety of modern literary theories can be used to explain the richness of the biblical text as a work of literature rather than a historical, religious, or sacred text. Some of the methodologies and topics that will be explored are Mythology, Formalism/Structuralism, Gender and Sexuality, Translation, and Law as Literature.

**HUMN-SHU 231 *Contemporary Art and Theory in North America and Europe.*** This course traces movements in North American and European art from 1945 to the present. Through a study of primary and secondary texts, artwork examples, and historic context students will explore how artists went beyond primarily object-based art and how institutional frameworks, media, politics, and social relations, informed contemporary art practice. The different ways artists engage with notions of space will also be examined. At the end of this course, students should be able to identify contemporary art movements, key artists, and relevant artworks. They should also be able to articulate the conceptual and visual strategies employed in these works and have a basic knowledge of the milieu in which they were produced.

**HUMN-SHU 271 *Humanities Research Lab: Study Immigrant Cities.*** Course Repeatable for Credit. To register students should indicate their interest here https://wp.nyu.edu/vip/ny-immigrant-city/ The instructor will reach out with permission codes for students to self-register in Albert. Student taking the course for the first time be limited to the 1-credit load, and more credit if repeat the course and take on more responsibilities up to 3 credits.

**INTERACTIVE MEDIA AND BUSINESS**

**IMBX-SHU 103 *Understanding Financial Technology.* “**How would you like to pay?” A simple question may provoke diversified answers in the digital age. The financial applications of digital technologies, or so-called fintechs have engendered many alternative forms such as QR codes, mobile apps, and Bitcoin for financial activities including payment, loans, and investment. What technologies make these innovations possible? What are the aesthetic norms embedded in fin-tech app designs? How do the fin-tech companies interact with banks, policy-makers, and regulators? While Ant Financial and Tencent Finance make China the leader of fin-tech innovation, how does the global map of fin-tech innovation look like? After all, how have fin-techs re-shaped people’s everyday life, and perhaps will reform human being? Through a weekly three-hour meeting, this course is to make sense of fin-techs from a wide variety of perspectives. Integrating lectures with workshops and company visits, this course will equip students with critical thinking and practical skills that allow them to dialogue with various actors, such as computer programmers, project managers, investors, as well as academic intellectuals.

**INTERACTIVE MEDIA ARTS**

**INTM-SHU 138T *Extended Perception.*** Utilizing technological and scientific research / case studies / artifacts, this class introduces students to the topic of enhanced / extended perception and how technological augmentation allow us to sense and perceive alternative layers of our surrounding world, reconfiguring our understanding of what reality really is. Students will be asked to develop their own prototypes that demonstrate a conceptual or functional outcome on how perception can be extended, enhanced, or even hacked.

**INTM-SHU 139T *After Us: Post-human Media.*** Ours is a time of unceasing image production. CCTV cameras wrap around the planet, machines make visual learning sets for other machines, hundreds of billions of hours of video material is livestreamed online every year, artists speculate about the possibility of making virtual reality for animals, and seemingly natural phenomena such as climate change can only be apprehended through risk simulations and data visualisations. Simultaneously, from deep fakes to computergenerated influencers and webcam models, digital images without real-life referents are set to become a part of social life, posing questions about the agency of media makers and consumers in an increasingly simulated world. Contemporary visual culture is not made by humans alone and sometimes not even meant for human eyes. What are we to make of aesthetics when they become automated? How can human collectives be thought from the perspective, or collaborate with, the semi-autonomous technological systems around us? What kind of conceptual capacities do we need to be able to think about the future of such media globally, and in specific geographical locations? In this class, we will explore the shi< that media theory and philosophy of technology have made towards the inhuman. From biometrics, insect media, and eco-media to soless description for INTM-SHU 139T

**INTM-SHU 205 *What is New Media?*** This course will explore the fundamentals of new media scholarship. Together, we will review and engage with different theories of emerging media in its social, cultural, political, corporeal, and artistic contexts. By course’s end, students will be able to research, think and write critically about some of the central issues in media theory. Prerequisite: Writing as Inquiry

**INTM-SHU 217T *Make Believe.*** We live in an era of information where the information can be written, accessed, shared, and also eliminated with a single stroke. As a result, the objective “truth” is brought to a question. In the last decade, artists have been experimenting with the fakeness of the truth and the truthfulness of the fake by creating fake documents, staged marriages, an arguably authentic artifact, imaginary advertisements both historical and contemporary. What does it mean to tell the truth in the context of art? How does art cross the boundaries between the real and the fake, truthfulness and misrepresentation? This course will examine social engagement of art and how “truth” is treated, interpreted, and presented. The class will take a field trip to a propaganda museum, have readings and discussions, and analyze artists working with fiction as a medium in art making. Students will work on projects to construct believable reality through object making (3D fabrication) and narrative construction (audiovisual material). Prerequisites: Interaction Lab or Communication Lab or Application Lab

**INTM-SHU 242 | INTM-SHU 235A *Exhibition: Next | Topics in Art & Design: Exhibition* Next** Exhibition: Next class is an exploration and observation of the fields of exhibition design and museum studies. This class will explore how emerging and interactive technologies can be applied to museum and exhibition design to enhance visitors’ experiences. What is an exhibition in a museum of today and how should it be experienced? What is the role of a museum in contemporary society? How does it engage the audiences of tomorrow? The class discusses curatorial practices, various exhibition concepts and forms, museum visitor experience, and exhibitions’ social values.

**INTM-SHU 266 *Digital Heritage.*** This course investigates and explores the integration between cultural heritage and digital conservation, specifically towards the objects, deities, sites, and gardens of China. Through the reflection of Chinese cultural heritage from the global perspective of Chinese history, the course raises awareness of heritage conservation and critical heritage studies towards the origins and the transformations of China in the contemporary era. Academic readings and oral presentations revolving around this theme will enhance students’ skills for documentation and restoration by innovative digital techniques in China. Conservator presentations, field trips, gallery visits and art projects enable students to communicate with practitioners in the field and examine the values of Chinese cultural heritage from a global perspective.

**JOURNALISM**

**JOUR-SHU 201T *Mixed Media Writing: Radio and Television.*** This course both introduces students to basic radio journalism, television journalism and podcast techniques and challenges those techniques. How has the digital revolution been transforming what we are now calling audio and video journalism? How can these forms continue to improve? Students will be presented with examples ranging from Edward R. Murrow’s seminal television documentary, Harvest of Shame, to installments of such pathbreaking radio programs as This American Life and Radio Lab, to experimental work such as Jorge Furtado’s Brazilian documentary, Island of the Flowers. Students will also be asked to share their own examples of effective audio and video journalism in a variety of styles, from a variety of countries. Readings, too, will be used as examples of what journalism has accomplished and might accomplish. This will be a hands-on course. Students will have an opportunity to produce their own audio and video journalism in traditional and nontraditional styles. No prerequisites.

**JOUR-SHU 202T *Topics in Journalism course: Newspaper Management.*** This two credit course gives students practical experience in the real world activity of publishing news and information for audiences, specifically through NYU Shanghai’s online student publication On Century Avenue. Students will be guided in the journalistic practice of preparing stories for publication and ensuring main and sub-sections of the website are populated with current and relevant content that covers on-going events and issues related to the Shanghai campus. The course will give students an opportunity to put into practice the theory and technical skills they have acquired during their Journalism course and/or in other Creative Writing courses. It will expose them to the realities and pressures of timely and time-sensitive news gathering as well as the publishing arts of content management and understanding audiences. They will have an opportunity to contribute as journalists, contributors, and editors of On Century Avenue. The Newsroom course will act as a production hub for the publication.

**JOUR-SHU 9202 *Methods and Practice: Journalism.*** It provides an introduction to the work of the reporter, with particular focus on covering China, and offers students a chance to learn and practice basic journalism skills, including news writing, descriptive & feature writing, and writing for TV etc. Feedback on assignments is given in individual meetings. Visiting speakers and field trips also offer insights into the role of the journalist and the challenges faced. Prerequisites: None.

**MATHEMATICS**

**MATH-SHU 9  *Precalculus.*** This course is designed as a preparation for calculus, including study of basic properties of polynomials, rational functions, exponential and logarithmic functions, and trigonometric functions. Systems of linear equations and matrix operations are also covered. Prerequisite: Placement via NYU SH Mathematics Placement Examination.

**MATH-SHU 131 *Calculus.***  This course presents the foundations of calculus for functions of a single variable. Topics addressed include limits, continuity, rules of differentiation, approximation,antiderivatives, indefinite and definite integrals, the fundamental theorem of calculus, integration techniques, and improper integrals. Prerequisite: Placement via NYU SH Mathematics Placement Examination or a grade of C or better in MATH-SHU 009.

**MATH-SHU 140 *Linear Algebra.*** This first course in linear algebra covers systems of linear equations, vectors, linear transformations, matrices and their determinants, vector spaces, basis and dimension, eigevectors and eigenvalues, quadratic forms, and matrix decompositions. In addition to its role as an essential topic within mathematics, linear algebra is also critically useful throughout the sciences: for example, in estimation theory, chemical equations, electrical networks, and heat distributions. Prerequisite or Co-requisite: Grade of C or better in Math-SHU 121 or 201. Equivalency: This course counts for MATH-UA 140.

**MATH-SHU 142 *Honors Linear Algebra II.*** This is the first semester of a 2-semester sequence in linear algebra for advanced mathematics majors. Topics covered include fields, vector spaces, linear independence, dimension, linear transformations, rank, matrices, eigenvalues, eigenvectors, determinants, characteristic polynomials, and the Cayley-Hamilton theorem. Examples from applications are also covered, including interpolation problems, traffic flows, genetics, the fundamental theorem of algebra, electric circuits, static mechanics, and consumption matrices in economics. Prerequisite: MATH-SHU 121 Calculus with a grade of A- or better OR Placement via NYU SH Mathematics Placement Examination.

**MATH-SHU 151 *Multivariable Calculus.*** This course explores calculus of functions of several variables. Topics covered include power series, differentiation and integration of functions of several variables, including directional derivatives, the gradient, line and multiple integrals, and the theorems of Green, divergence, and Stokes. Prerequisite: Grade of C or better in MATH-SHU 131. Equivalent to MATH-UA 123, MATH-AD 112.

**MATH-SHU 160 *Networks and Dynamics.*** Today, networks and dynamics play fundamental roles throughout science, engineering and the social sciences. This is a post-calculus mathematics course that is designed to prepare students to understand the mathematical behavior of networks and dynamics as the students enter a broad set of majors -- from mathematics, the natural sciences and engineering through the social sciences such as economics and finance. The preliminary goal is to address the following challenge: today’s science and society at large requires us to understand complex networks (be it genetic network that makes us who we are, neural network underlying our brain functions, social network of friends through Facebook or WeChat) and how the behavior of such a complex network evolves in time. The language for providing a scientific understanding of such systems is the mathematics of network theory and dynamical systems theory. This course will introduce analytical methods and mathematical models from network and dynamical systems theory toward understanding dynamical network behavior. Prerequisite: Grade of C or better in MATH-SHU 121 OR 201 and MATH-SHU 140.

**MATH-SHU 226 *Functional Analysis.*** This course on applications of concepts in functional analysis gives special emphasis to function spaces used in practice, including Hilbert, Hardy, and Sobolev spaces. Other topics covered include the spectral theorem and its application to differential equations, Fourier series, compact operators, Fredholm determinants, measure, volume, and nonlinear analysis for infinite-dimensional spaces, and Brownian motion. Prerequisite: Grade of C or better in MATH-SHU 141 and MATH-SHU-G 2430 OR 339

**MATH-SHU 233 *Honors Theory of Probability.*** This course is an introduction for mathematics majors to the mathematical treatment of random phenomena occurring in the natural, physical, and social sciences. Topics covered include axioms of mathematical probability, combinatorial analysis, the binomial distribution, Poisson and normal approximation, random variables, probability distributions, generating functions, and Markov chains and their applications. Prerequisite: Grade of C or better in Honor Analysis and MATH-SHU 140 linear algebra. Equivalency: This course counts for MATH-UA 233. Non-Shanghai students need to get the instructors' permission to enroll in classes.

**MATH-SHU 236 *The Mathematics of Data Science and Machine Learning.*** This course is the second part and continuation of an introduction to the mathematical tools of modern statistical analysis and of data-science. Pre-requisite: MATH-SHU 234

**MATH-SHU 250 *Mathematics of Finance.*** Introduction to the mathematics of finance. Topics: linear programming with application to pricing. Interest rates and present value. Basic probability, random walks, central limit theorem, Brownian motion, log-normal model of stock prices. Black-Scholes theory of options. Dynamic programming with application to portfolio optimization. Prerequisites: MATH-SHU 123 (Multivariable Calculus) and 235 Probability and Statistics ( or 233 Theory of Probability)

**MATH-SHU 25*2 Numerical Analysis.*** In numerical analysis, one explores how mathematical problems can be analyzed and solved with a computer. This has very broad applications in mathematics, physics, engineering, finance, and the life sciences. This course gives an introduction to numerical analysis for mathematics majors. Theory and practical examples using Matlab will be combined to study a range of topics, from simple root-finding procedures to differential equations and the finite element method. Prerequisite: Grade of C or better in MATH-SHU 123 and MATH-SHU 140, or MATH-SHU 141 and MATH-SHU 329.

**MATH-SHU 262 *Ordinary Differential Equations.*** This course introduces the main ideas of ordinary differential equations. Topics include vector fields, existence and uniqueness of solutions to first-order linear differential equations, stability, higher order differential equations, the Laplace transform and numerical methods, linear and nonlinear systems, and Sturm-Liouville theory. Prerequisite: Grade of C or better in MATH-SHU 121 and 140 or MATH-SHU 141 and 201 Equivalency: This course counts for MATH-UA 262.

**MATH-SHU 263 *Partial Differential Equations.*** Many laws of physics are formulated as partial differential equations. This course discusses the simplest examples, such as waves, diffusion, gravity, and static electricity. Nonlinear conservation laws and the theory of shock waves are discussed, as well as further applications to physics, chemistry, biology, and population dynamics. Prerequisite: Grade of C or better in MATH-SHU 262 or 362. Equivalency: This course counts for MATH-UA 263.

**MATH-SHU 282 *Functions of a Complex Variable.*** Complex variables and functions play an essential role in many branches of mathematics and science. In this course, we cover basic aspects of the theory, including differentiation of complex functions, the Cauchy-Riemann equations, Cauchy’s theorem and integral formula, singularities, Laurent series, conformal mapping, analytic continuous, and applications to fluid flow. Prerequisite: Grade of C or better in MATH-SHU 123 and MATH-SHU 140, or MATH-SHU 141 and MATH-SHU 329. Equivalency: This course counts for MATH-UA 282.

**MATH-SHU 328 *Honors Analysis I.*** This course is a continuation of Honors Calculus. Topics covered include integration techniques, trigonometric functions, the logarithm, exponential functions, approximation by polynomials, sequences, series, convergence, uniform convergence, power series, Taylor series, complex numbers and functions, Euclidean spaces, and basic topology. Prerequisite: Grade of C or better in MATH-SHU 201. Equivalency: This course counts for MATH-UA 328.

**MATH-SHU 348 *Honors Algebra I.*** This introduction to abstract algebra is a rigorous study of groups and rings. Topics covered include symmetric and linear groups, the Sylow theorems, classification of finitely generated abelian groups, polynomial and quotient rings, ideals, principal ideal domains, unique factorization, and the Nullstellensatz. Prerequisites: Grade of C or better in MATH-SHU 123 and MATH-SHU 140, or MATH-SHU 141 and MATH-SHU 329.

**MATH-SHU 377 *Differential Geometry.*** This course investigates the differential properties of curves and surfaces. Topics covered include differential manifolds and Riemannian geometry. Prerequisite: Grade of C or better in MATH-SHU 329.

**MANAGEMENT**

**MGMT-SHU 4 *Global Strategy.*** The world is going through fundamental and structural changes. The Global Strategy course discusses the implications for business strategy and challenges and opportunities that companies face. As the process of globalization and digitization accelates, business organizations are exploring new ways to adapt and grow. The emphasis will be placed on how companies operate in different socio-economic, technological, and institutional environments and overcome these differences, what kind of analytical tools may be used to assess international market conditions, and the sources of competitive advantage in a dynamic global context. Students will learn methods to build strategic mindset and capabilities to navigate in a fast changing global environment. Prerequisite: Sophomore standing or above.

**MGMT-SHU 18 *Strategic Analysis.*** This course provides an introduction to the basic frameworks of modern strategy that aim to help firms establish and sustain competitive advantages. The objective of this course is to introduce students to the role of the “general manager,” who is faced by core strategic choices that concern the long-term performance of the firm, and provide them with the necessary skills to formulate and implement effective strategies. This course is equally relevant for students who want to work with companies as consultants, attorneys or investors, helping clients understand and solve critical strategic issues. From this course, you’ll learn to think critically and analytically about competitive business situations. You’ll also learn to embrace uncertainty, ambiguity and complexity of these situations, and to help firms improve the decision making process with sensible and actionable solutions. Firm performance is jointly determined by external economic and internal organizational forces. As a general manager, students need to have the ability to conduct strategic analysis at both the firm and industrial levels. To help them develop these analytical skills, this course is organized around four questions that are central to firms' strategic decisions: • What is the firm’s external environment? • What is the firm’s competitive advantage? • With whom should the firm compete? • How should the firm compete? To answer these questions, we will cover the following four main topics in this course: • Industry analysis: the environment, opportunities, threats, industry competition • Firm level strategy: competitive advantage • Competitive dynamics • Corporate strategy This course combines interactive lectures and case analyses. While the lectures provide a synthesized theoretical framework as the guidance for logical thinking, the case analyses offer an opportunity to integrate and apply the theoretical framework in a practical way.

**MGMT-SHU 301 *Management and Organizations.***  This course addresses contemporary management challenges stemming from changing organizational structures, complex environmental conditions, new technological developments, and increasingly diverse workforces. It highlights critical management issues involved in planning, organizing, controlling, and leading an organization. Ultimately, it aims to strengthen students’ managerial potential by providing general frameworks for analyzing, diagnosing, and responding to both fundamental and complex organizational situations. It also provides opportunities for students to enhance their communication and interpersonal skills, which are essential to effective management. The structure of the course encourages learning at multiple levels: through in-class lectures, exercises, and discussions; in small teams carrying out projects; and in individual reading, study, and analysis. Prerequisite: None.

**MARKETING**

**MKTG-SHU 2 *Consumer Behavior.*** This course presents a comprehensive, systematic, and practical conceptual framework for understanding people as consumers—the basic subject matter of all marketing. It draws on the social sciences to evaluate the influence of both individual and ecological factors on market actions. Students discuss relevant psychological and sociological theories and study how they can be used to predict consumers' reactions to strategic marketing decisions. Basic methodologies for research in consumer behavior are developed and applied. Course emphasis is on developing applications of behavioral concepts and methods for marketing actions. Pre-requisite: Intro to Marketing

**MKTG-SHU 3 *Advertising Management.*** This course provides students with a comprehensive framework and tools to understand the advertising process and to appreciate managerial and theoretical perspectives in advertising. It tackles the stages in developing an advertising plan- from analyzing the situation and defining clear advertising objectives to execution. Students learn tools related to various skill areas in advertising, including account planning, media planning and buying, and copywriting/art direction, while developing a broader appreciation of how each skill area fits into the overall structure of the advertising process. Coursework involves a comprehensive group project that utilizes learning in all functional areas of advertising, while simulating the development of an advertising campaign. Prereq: Intro to Marketing (MKTG-SHU 1)

**MKTG-SHU 57 *Digital Marketing.***  Digital marketing has experienced tremendous growth and attention over the last few years, thanks to technological innovation and rapid changes in online social networks and digital consumer behavior. This course tackles the latest topics in digital marketing (e.g. digital platforms, online reviews, mobile marketing, influencers), through a combination of business case studies reflecting recent frameworks in the field, in-class exercises on metrics and methods for evaluating the success of digital marketing, and coverage of the latest news and innovation in digital marketing. This course also provides in depth exposure to the psychology of virality and social influence in digital contexts, which is critical for understanding both social media marketing and broader cultural trends. Prerequisite: Intro to Marketing (MKTG-SHU 1)

**MKTG-SHU 64 *Global Marketing Strategy*** Examines the specific issues involved in entering international markets and in conducting marketing operations on an international scale. Attention is focused on problems such as identifying and evaluating opportunities worldwide, developing and adapting market strategies in relation to specific national market needs and constraints, and coordinating global marketing and branding strategies. Emphasis is on strategic issues relating to international operations rather than on technical aspects of exporting and importing. Pre-Requisite: Introduction to Marketing

**NEURAL SCIENCE**

**NEUR-SHU 100 *Math Tools for Life Sciences*** This course will provide a broad introduction to basic mathematical and statistical tools for a quantitative analysis in the life sciences. It will cover a broad range of topics, including introduction to linear algebra, probability, linear regression, and statistical tests. We will use the mathematical programming language MATLAB for in-class demonstrations, computer lab during recitations and homework assignments. Prerequisite: Foundations of Biology I and/or Foundations of Biology II (or permission by the instructor)

**NEUR-SHU 222 *Perception*** How do humans and other animals obtain knowledge about the world? It is easy to take perception for granted, but complex processes (only partly understood) underlie our ability to understand the world by seeing, hearing, feeling, tasting, and smelling it. Perception has fascinated philosophers, physicists, and physiologists for centuries. Currently, perception is a central topic not only in neuroscience, but also in psychology, cognitive science, and computer science. How do scientists approach perception? We seek to discover lawful relations between perceptual experiences and the physical world and to develop models of the processes and mechanisms that produce these connections. To accomplish this, we need accounts of the information, the computational processes, and the neural mechanisms involved in perception. In this course, we will discuss fundamental problems in perception (primarily vision), and learn about techniques that are applied in attempts to solve these problems. The learning outcomes of this course include a better understanding of human perception and critical thinking skills for the analysis and interpretation of the related research reports. PREREQUISITE COURSES Introduction to Neural Science or Introduction to Psychology. The prerequisite can be waived based on the student’s background. Contact the course instructor directly for this request.

**NEUR-SHU 251 *Behavioral and Integrative Neuroscience*** This lecture and laboratory course addresses the physiological and anatomical bases of behavior. Lectures and laboratory experiments will emphasize mammalian sensory, motor, regulatory, and motivational mechanisms involved in the control of behavior, and higher mental processes such as those involved in language and memory. Prerequisite: NEUR-201.

**PHILOSOPHY**

**PHIL-SHU 80 *Philosophy of Mind*** Examination of the relationship between the mind and the brain, of the nature of the mental, and of personal identity. Can consciousness be reconciled with a scientific view of the world?

**PHIL-SHU 202T *Topics in Epistemology*:** Imagination This course satisfies HUMN Topic/other advanced course.

**PHYSICS**

**PHYS-SHU 12 *General PhysicsII*** This course is an introduction to electricity and magnetism, light, geometrical and wave optics. Many concepts from General Physics I will be used in this course such as velocity, acceleration, force, Newton’s laws of motion, work and energy. The course uses high school algebra, geometry and trigonometry, vectors and vector arithmetic, and some basic calculus. The algebra, geometry, and trig are essential. The course has lecture, homework and laboratory components. prereq: General Physics I (PHYS;SHU 11).

**PHYS-SHU 93 *Foundations of Physics II*** Honors Continuation of Foundation of Physics I. Topics include electric charge and electric field, electric potential, Gauss’s law, capacitor, current, circuits, magnetic fields, induction, electromagnetic waves, and Maxwell’s equations (in an integral form). This is the second semester of a four-semester calculus-based introduction to Physics, and is intended for physics majors and other interested students. Prerequisite: Foundation of Physics I Honors (PHYS-SHU 91), Freshman Math (including linear algebra, vectors, linear vector spaces and matrices, functions of several variables, partial derivatives, multiple integrals) Textbook: Young and Freedman, Sears and Zemansky's University Physics with Modern Physics, 14th Edition.

**PHYS-SHU 96 *Foundations of Physics IV*** Honors Continuation of Foundation of Physics III. Topics include Relativity, Photon, Quantum Mechanics, Molecules and Condensed Matter, Nuclear Physics, Particle Physics and Cosmology. This is the fourth semester of a four-semester calculus-based introduction to Physics, and is intended for physics majors and other interested students. Textbook: Young and Freedman, Sears and Zemansky's University Physics with Modern Physics, 14th Edition.

**PHYS-SHU 106 *Mathematical Physics*** Mathematical preparation for the junior and senior courses in physics. Vector analysis, Fourier series and integrals, ordinary differential equations, matrices, partial differential equations, and boundary-value problems.

**PHYS-SHU 200 *Optical Imaging: Applications in Biology and Engineering*** Optics and imaging technology play very important roles in science and engineering. For example, the images collected by the Hubble Telescope, since year 1990, have revolutionized modern astronomy. In biology, the use of two-photon excitation microscopy has significantly advanced neuroscience, as we are now able to track the intracellular development at sub-micron resolutions. A typical course in optics offered at any university often focuses on the fundamental aspects of light but much less on its vast applications in the real world. This short course will exemplify the power and usefulness of optics in current sciences and technology, especially in biology and engineering. Prerequisites: Physics 2 or Physics 2 for Honors.

**PHYS-SHU 201 *Topics: Introduction to Quantum Theory and Technology Quantum*** mechanics is the theory that tells us how everything we see around us - from atoms, light, electrons, to materials - behaves at the microscopic level. Starting from its abstract beginnings in the early 20th century, in the 21st centery we are entering a new age where we can control individual atoms and create quantum systems for new technologies. This course gives a simplified introduction to quantum theory, for students who wish to understand quantum mechanics only to a basic level to see some of its applications. The first part of the course introduces the key aspects of quantum mechanics. In the second part we apply these ideas to technological applications such as quantum teleportation, quantum computing, and cryptography. Pre-requisite: Calculus

**PHYS-SHU 251 *Electricity and Magnetism I***ntroduction to Maxwell's equations with applications to physical problems. Topics include electrostatics, magnetostatics, the solution of the Laplace and Poisson equations, dielectrics and magnetic materials, electromagnetic waves and radiation, Fresnel equations, transmission lines, and wave guides. Prerequisites:PHYS-SHU 95 Foundations of Physics III Honors and PHYS-SHU 106 Mathematical Physics

**RELIGIOUS STUDIES**

**RELS-SHU 9270 *Religion and Society in China: Ghosts, Gods, Buddhas and Ancestors.*** This course is a survey of the major historical and contemporary currents of China’s religious thought and practice, including Buddhism, Confucianism, Daoism and “popular religion”. It will focus on the interactions between such teachings and practices, as well as on the role of religion in Chinese society. You will study topics such as divination, visual culture, ritual, ancestor worship, morality, longevity techniques, healing practices and meditation. A selected number of primary and secondary sources will be discussed in each lecture; documentary films and visits to religious sites will be also key constituents of the course. Please note if you miss the first class of the term, you will need to contact the instructor to determine if you can still remain enrolled in the course.

**SOCIAL SCIENCE**

**SOCS-SHU 136 *Human Society and Culture*** In this course we examine contemporary cultural, social, and political issues through the lens of socio-cultural anthropology, the study of human society and culture. We approach the discipline through a historical examination of how anthropologists have studied rituals and beliefs, family and kinship, sex and gender, systems of exchange, bodies and selves, race, nationalism, globalization, power and human agency. Students become familiar with ethnography, the study of cultural and social systems through long-term fieldwork and observation. In addition to introducing students to the history of anthropological thought, we study contemporary ethnographies that explore border-crossing and migration, media and digital social lives, infrastructure and state-making, and faith and development.

**SOCS-SHU 201 *Planning Global Cities: Urban Form and Spatial Transformation*** This course takes an interpretative look at the spatial conditions of our rapidly urbanizing world. It focuses on comparisons and contrasts between urban development patterns of global cities, such as New York City, Shanghai, Abu Dhabi, and Mumbai. By introducing multiple scales (neighborhood, city, and regional) of urban growth, the course seeks to foster an understanding of the socio-economic processes, physical planning and design practices, cultural influences, and policy interventions that influence urban design and planning. While introducing the basic analytic skills necessary for spatial interpretation, the course addresses the challenges and opportunities of future smart cities in the era of urban big data. Pre-requisite: SOCS-SHU 133 Urbanization in China is recommended but not required

**SOCS-SHU 426 *Poverty and Inequality Around the Globe*** This seminar examines the causes and consequences of poverty and rising inequality around the globe. Students will study the ways in which poverty and inequality are shaped by multifaceted contexts; understand the theories underlying strategies and programs which address key poverty and inequality issues faced by many developed, developing and least developed countries; and learn about different countries' experiences addressing their own poverty and inequality issues. We consider philosophies of global justice and the ethics of global citizenship, and students are expected to critically reflect upon their own engagements with poverty relief activities and aspirations for social changes. Students should be prepared to tackle advanced social science readings, analysis, and writing. Open to seniors, and to other students with instructor’s permission. There are no prerequisites for the class although students should be prepared to tackle advanced social science readings and analysis.

**SOCS-SHU 445 *Topics in Society, Health & Medicine | Topics in Society, Health & Medicine: Trauma and Memory*** Topics in Society, Health, and Medicine is a series of seminars designed to explore current scholarship in the social study of medicine drawn from history, anthropology, and public health science. One seminar a year is organized around a theme (e.g. aging, medical ethics, therapeutics, access to care) that determines the readings and guides the discussions. The series emphasizes contemporary problems in medicine viewed from a humanistic perspective. The seminars are taught by the Director of the Center for Society, Health, and Medicine alongside visiting faculty and pre- and post-doctoral fellows from the Center. Satisfies Social Science focus Anthropology/Global Health 400 level. Pre-requisite: none, but junior or senior standing is recommended.