COURSE NUMBERS AND DESCRIPTIONS

Agility Praxis Pathway (General Education Requirements, Effective Fall 2024)

OVERVIEW

The APP Model—Agility Praxis Pathways— serves as the backbone of our academic approach, reflecting our commitment to a new paradigm of higher education. Infused with the principles of Universal Design for Learning (UDL) and a commitment to all students at the center of the learning conversation, the APP model is a response to the evolving, multifaceted needs of students, employers, and the broader global challenges at hand. As such, this model is designed to foster agility to not only adaptively navigate but flourish amidst change, honor praxis - bridging the rich traditions of academic inquiry with the imperative of pragmatic creativity, and offer flexible, clear pathways to make progress toward goals and respond to new opportunities. Here's how it unfolds in our academic environment:

Think: At the onset, the "Think" stage immerses students in a rich tapestry of texts and multimodal resources, broadening perspectives and sparking curiosity about the subjects at hand. This phase introduces students to a wide range of materials—from guest speaker insights to flipped classroom videos, and diverse reading assignments—designed to stoke vibrant discussions and healthy debate. It emphasizes increasing intellectual friction while decreasing social friction, fostering an environment where visible thinking routines and self-inquiry flourish. This foundational step ensures students are not just passive recipients of information but active participants in their learning journey.

Do: The "Do" phase emphasizes the deliberate practice of the skills, mindsets, and behaviors pivotal to the course's goals and student learning outcomes. Academic disciplines act as lenses through which students engage with content, allowing them to apply domain-specific skills consistently. It is about learning by doing, where knowledge meets practice in a dynamic interplay. Whether it's through sustained writing exercises, hands-on experiments, or iterative design processes, this stage is about deep engagement with the material and the cultivation of practical skills. By encouraging students to apply what they learn in real-time, we bridge the gap between theoretical knowledge and practical application.

Create: Finally, the "Create" stage empowers students to synthesize their learning and skills into tangible outputs. Building on their acquired knowledge and practiced abilities, students craft projects, artifacts, written works, and presentations that demonstrate their progress and mastery of course objectives. This creative application not only serves as evidence of their learning journey but also as a portfolio showcasing their capabilities and readiness to tackle real-world challenges. It's here that the full cycle of the APP Model comes to fruition, encapsulating the essence of our academic philosophy: to think deeply, act purposefully, and create meaningfully.

Through the APP Model, we commit to preparing students not only for academic success but for a lifetime of intellectual exploration, professional achievement, and creative contribution. This approach embodies our vision of the education paradigm we need – one that is responsive, experiential, and forward-looking.

SFBU Promise Statement, Student & Faculty Competencies

SFBU equips students with the competencies and skills to thrive and inspire the common good in an ever-changing world. As such, graduates stand out. They are tenacious leaders, interpersonally gifted, global navigators, technology trendsetters, and enlightened thinkers.

COURSES

APP 101: How To Tell Your Story:
Cornerstone Course I (3 credit hours)

How to Tell Your Story weaves together the art of writing with the principles of design thinking to explore the transformative power of story in both self-discovery and academic discourse. In this course, you will explore and consistently practice the multifaceted process of writing, from the initial stages of brainstorming and outlining to the nuanced tasks of drafting, revising, and editing. Emphasizing the strategic crafting of thesis statements, the development of persuasive arguments, and the integration of evidence, you will learn to communicate your ideas with clarity, coherence, and compelling engagement. Digital tools, including those powered by AI, will be embraced with intentional use cases and explorations throughout the course, allowing you to build marketable skills and develop, refine, and amplify your voice.

Through this introspective journey, you and your classmates will unpack your stories, research and identify recurring themes, and cultivate the ability to articulate your unique narratives. This exploration serves as a cornerstone for developing a nuanced understanding of one's path and potential, bridging the gap between personal insight and academic expression.

APP 102: How to Design Your Life: A Journey Through Personal Epistemology
Cornerstone Course II (3 credit hours)

This course empowers you to become the architect of your own life by critically examining the beliefs, values, and assumptions that shape your choices. You will reflect deeply on how your worldview is influenced by factors such as family, culture, education, media, and lived experience. Through guided self-inquiry and practical exercises, you'll clarify your understanding of what success, meaning, and purpose look like in your life. You'll explore eight essential life domains: physical health, mental health, spiritual health, relationships, finances, play, growth, and career. In each domain, you will design and conduct mini experiments to discover what genuinely supports your well-being, growth, and fulfillment. Applying design thinking principles, including empathy, ideation, prototyping, and iteration, you'll develop strategies to navigate life's challenges with creativity, resilience, and intention. The course culminates in the creation of a personalized, balanced, and evolving four-year life plan that integrates your insights across all life domains.

Throughout the course, you will strengthen critical thinking and analytical skills, enabling you to thoughtfully engage with diverse perspectives and make informed decisions as you intentionally design your future at SFBU and beyond.

APP 103: How to Communicate in a Global Context (3 credit hours)

This course delves into the complexities of communication in a globalized world, examining cultural nuances, technological advancements, and cross-cultural communication strategies. You'll

develop skills to effectively communicate and collaborate across diverse cultural and linguistic contexts. Building from foundational communication practices to nuanced cultural navigation and interaction skills for impact and influence, you'll consistently grow your skills to communicate in multiple methods and modalities (e.g., public speaking, written communication, visual communication, debate). This course experience will include deliberate practice experiences (in varied cultural settings), and feedback loops with a small community of practice to accelerate skill development.

APP 104: How to Lead: Transforming Insights from History into Modern Movements (3 credit hours)

This course offers a comprehensive exploration of modern leadership theories, contemporary approaches to leadership, and timeless lessons from a historical survey of influential leaders. Through the analysis of case studies, contemporary examples, and impactful social movements (spanning figures from Mahatma Gandhi to Colin Kaepernick), you will explore the complexities of leadership in today's world and examine the role of leaders in driving meaningful change. The course will address the timeless questions such as the following: What does it truly mean to lead? What defines a great leader? How do movements take shape and gain momentum? How have perceptions of leadership and its methods evolved over time? Predicated on lessons learned in the course, you will develop a deeper understanding of your own leadership style, explore movements that resonate with you, and apply your insights in a final project. This project will challenge you to design a movement, identify the leadership skills and strategies necessary to support it, and create a model campaign to launch your vision into action.

APP 201: How to Use Math in Real Life: The Mathematical Mindsets that Shape Our World (3 credit hours)

Reimagine what it means to be mathematically empowered. In this course, we move beyond rote procedures and isolated rules and instead explore mathematics as a flexible, conceptual, and creative way of thinking — a way to make sense of the world, solve meaningful problems, and shape a more just and informed society.

This course cultivates mathematical mindsets that prioritize curiosity, connection-making, and conceptual understanding. Further, this course equips you to explore the power of productive struggle, solve problems creatively, and develop resilience in mathematical problem-solving. Through engaging explorations, deep analysis, deliberate practice, and immersive real-world applications, you will discover the mathematical mindsets that shape our world as you develop your own and put them to work in meaningful ways.

Whether exploring how strong quantitative reasoning helps us flexibly interpret and estimate with numbers, uncovering the power of linear equations to model relationships, or investigating how data can both reveal and distort truth, you'll gain tools for navigating and influencing the world around you. Along the way, you'll recalibrate common cultural fears of "being wrong" and come to see struggle and mistakes as vital, generative steps in mathematical thinking.

Together, we'll analyze how math shapes key fields that address societal needs— as well as its role in social justice, public decision-making, and innovation. You'll also explore the ethical dimensions of mathematical applications, learning how to question assumptions, interpret data with skepticism, and advocate for the responsible use of quantitative reasoning.

By the end of the course you'll be able to think like a mathematician with flexibility, critical analysis, creativity, and connection.

APP 202: How Your Brain Works (3 credit hours)

This course invites you to discover the inner workings of your brain. At its core is a unique learning experience architecture that blends foundational neuroscience with applied psychology, helping you understand how your brain works and how to use it.

You will learn about the underlying mechanisms that enable your brain to sense your surroundings, control your behavior, make decisions, form memories and learn from experience. After examining the brain's structures and functions and exploring how cognitive processes like attention, memory, and learning agility operate beneath the surface, you'll critically evaluate how these mechanisms influence your habits, decisions, and behaviors and learn how to shift them intentionally.

Rather than stop at studying science, you'll become an active participant, designing and conducting personal experiments to test learning strategies, build better habits, and deepen metacognitive awareness. You'll demonstrate your understanding by articulating key neuroscientific insights and their real-world applications through collaborative projects, reflective writing, and interactive experimentation.

By course end, you'll be equipped not only with the knowledge to understand your brain but with the practical skills to optimize its performance in a world of distraction, complexity, and change.

APP 203: How to "Be Creative" in Partnership with Computation & Machine Learning (3 credit hours)

What makes creativity uniquely human and how is that definition evolving in the age of AI?

This course invites you to explore the evolving relationship between human and computational creativity by examining your own creative process and learning how to use AI as a tool for creative problem-solving. You'll reflect on the cognitive, emotional, and environmental factors that influence your creativity, and develop strategies for working through ambiguity, setbacks, and the nonlinear nature of creative thinking.

At the same time, you'll engage with the world of computational creativity through hands-on experimentation with generative tools, machine learning, and algorithmically driven media. You'll explore how technology can be used not just to replicate creativity, but to extend it—helping you push through blocks, generate new possibilities, and reimagine what's possible in your personal and professional work.

Throughout the course, you'll design and evaluate original creative products using a 360-degree feedback process, consider how creative practice supports mental wellness and self-awareness, and explore how to shape environments that support creative flow.

Whether you're prototyping ideas, designing creative outputs, or reflecting on how you think, this course is about deepening your creative identity and exploring how human and machine creativity can complement one another in meaningful, future-focused ways.

APP 204: How to Use Data Science & Game Thinking for Social Impact (3 credit hours)

This course navigates the intersection of data science, game theory, and social sciences to tackle pressing societal challenges. Through a transdisciplinary lens, this course explores the methodologies of systems and framework thinking, providing you with the tools to analyze complex social issues such as poverty alleviation, healthcare access, environmental sustainability, and social justice.

The course revolves around the central question: How can we create a framework for addressing critical social challenges? You will engage in hands-on projects that integrate critical problem-solving methodologies from interdisciplinary fields such as critical thinking, information sciences, data modeling, and research methods. By applying these methodologies to real-world scenarios, you'll gain practical experience in analyzing data, identifying key variables, devising strategic interventions and considering the ethical implications of interventions to address social issues. The final application project in this course will be to work with a collaborative group to create a framework addressing a critical social challenge, informed by your exploration of data science and thinking methodologies.

APP 301: How Can We Thrive? Scientific Inquiry & the Future of Sustainability (Collective Capstone) (3 credit hours)

This course examines the delicate balance required for Earth's sustainability through the lens of physical and biological sciences. You'll gain a deep understanding of and appreciation for the interconnectedness of natural systems and the critical role they play in our planet's health alongside emerging interdisciplinary innovations aimed at solving and preventing sustainability challenges.

Applying a systems thinking approach throughout your investigations, you'll consistently seek balance and awareness of the interactions amongst the three central concepts for sustainability: environmental integrity, economic viability, and social equity.

With these three key sustainability concepts in constant consideration, you'll explore both longstanding and emerging topics crucial to sustainable development. This includes renewable energy, sustainable materials, and circular economy principles, as well as emerging practices in bio-inspired design—where engineering and technology mimic biological processes; understanding the implications of climate change on global biodiversity; and investigating how nanotechnology can reduce pollution and enhance energy efficiency. We'll consider possibilities in sustainable agriculture practices that ensure food security without damaging the environment and explore the critical ecosystem services, such as water purification and carbon sequestration, vital for maintaining biodiversity.

As we confront some of the most significant challenges facing our planet and society today, this course invites your curiosity, passion, and creativity to identify and prepare to address a sustainability issue. You'll integrate the knowledge and skills acquired to propose innovative solutions—solutions that you can develop from concept to testable prototype in your capstone project next semester.

APP 302: How to design social innovation/impact solutions to thrive | SFBU Capstone (3 credit hours)

If you want to incubate a social impact entrepreneurial venture during your university experience SFBU has a unique/ unparalleled social impact entrepreneurship pathway available. As a part of the core curriculum, each student will go through the design thinking process of user research, defining the problem they aim to solve, challenging assumptions, ideation, and prototyping (*empathize, define, ideate, prototype, test*).

If a student chooses to move to a cycle of testing and refining their prototype, SFBU offers a unique opportunity to not only earn university credit hours but also receive a comprehensive set of support and multiple meaningful relationships with industry experts and mentors to give it a go, launching an LLC or 501(C)3 during their university experience.

In alignment with the SFBU Student Experience Pillars (Career Readiness, Academics, Life Literacy, Wellness, Multiple Meaningful Relationships, Financial Support) SFBU's social impact entrepreneurship pathway will offer a unique program teaching at the intersection of social impact/citizenship, business administration, and wellness. How to do good (impact), while doing good (financially), and feeling good (wellness).

General Education Requirements prior to Fall 2024

Undergraduate Course Numbers and Descriptions

For general education, lower-division courses are numbered in the 100s and 200s, and upper-division courses are numbered in the 300s and 400s.

Course No.	Description
100–199	Freshman-level courses
200–299	Sophomore-level courses
300–399	Junior-level courses
400–499	Senior-level courses
450–499	Senior-level specialized skills courses taken for undergraduate-level credit

Courses are listed by subject: English, Humanities, Mathematics, Physics and Physical Sciences, and Social Science. Each course description is followed by any prerequisite or corequisite information.

Each **1-credit-hour lab** course requires at least 2 contact hours of lab work each week.

English

(GE in English and Communication area)

ENGL100 English Structure and Composition (0 credit hours)

This course focuses on the structural components of academic writing, starting with the parts of speech, the parts of a sentence, and the building blocks of phrases and clauses. It covers sentence types and variety, parallelism, proper word usage and punctuation, and avoiding sentence errors. This course also emphasizes unity and coherence, as well as the structure of paragraphs and standard academic essays.

ENGL101 Expository Writing (3 credit hours)

This fundamental-level college writing course is based on a systematic approach to addressing students' needs in acquiring knowledge and skills in written communication. It explores an integrated approach to the mechanics of communication, encompassing a full range of basic concerns in informative writing, going from processes to its forms to the popular techniques writers have used to make their works outstanding. Students enhance their writing skills through the process of prewriting, organizing, drafting, revising, and editing expository essays. By the end of the semester, students should have functional knowledge of English grammar, sentence structure, and punctuation and be able to write effective academic expository and persuasive essays.

ENGL102 Critical Thinking (3 credit hours)

This course focuses on becoming an effective provider and consumer of ideas in our information-saturated society. Students will learn to identify the intent of the message, judge the soundness of the argument, and evaluate the validity of the evidence. Rigorous training will help learners go beyond feelings and personal biases to clear, impartial, and accurate problem-solving and decision-making that are essential to all human communication: speaking, writing, debating, and persuading.

ENGL115 Public Speaking (3 credit hours)

This course is designed to develop effective skills in extemporaneous speaking, formal presentations, and listening. Students will learn about nonverbal communication, cultural differences in communication, and research methodology.

ENGL220 Small Group Communication (3 credit hours)

This course is designed to accomplish the following learning goals: 1) to help the students understand theories and principles of small group decision-making and problem-solving, 2) to provide students with hands-on experience working in small groups, the most powerful tool in modern industry, and 3) to offer students opportunities to observe the development and operation of real-life task-oriented groups.

ENGL320 Intercultural Communication (3 credit hours)

This course introduces theories and practices regarding intercultural relationships and communication. It helps students adapt to a rapidly diversified workforce both in Silicon Valley and in other parts of the world. From the vantage point of this course, students will see the forces that shape cultures and influence intercultural contacts. They will be enabled to build harmonious and productive relationships with individuals from all national, ethnic, and linguistic backgrounds.

ENGL425 Modern American Literature (3 credit hours)

This course examines fiction and nonfiction writing produced by American authors in the 20th and 21st centuries. It will cover the themes, styles, and content of modern American authors. Genres such as drama, action, and science fiction will be investigated. Students will be asked to analyze context, culture, time, and structure. This course requires critical thinking on essays written about various readings.

Prerequisite: ENGL101

Humanities (GE in Humanities area)

HU210 Introduction to Philosophy (3 credit hours)

This course is an introduction to the great questions of philosophy using a historical approach. The class covers Western and non-Western traditions from pre-Socratic and Confucian times to modern times.

HU230 Art Appreciation (3 credit hours)

A crash course in Western art aesthetics from ancient art to post-modernism, this course gives the student a historical Western art background that makes comparisons to the East, as well as the tools to analyze paintings through their own cultural point of view.

HU240 Music Appreciation (3 credit hours)

This course is designed for students to explore the fundamentals of music through easy-listening examples from all aspects of sound: tone, color, harmony, rhythm, mood, dynamics, tempo, themes, and forms. Students will analyze music with respect to the historical and cultural context as well as to daily life.

HU280 Principles of Ethics (3 credit hours)

This course is designed to reveal ethical principles and problems applicable to their lives. Topics include the application of ethical principles, background and philosophical principles of ethics, ethical practices, and practical ethical problems and solutions.

HU420 Critical Analysis of Film (3 credit hours)

This course examines the impact of film on society and vice versa. Students will review, critique, and analyze several films throughout the semester. It also examines the content, meaning, history and culture of American and foreign films. Various genres and film movements will be viewed and discussed. Knowledge, insight, and critical analysis will be required to demonstrate how the selected films reflect and impact cultures.

HU450 Information Literacy for Academics, Life, and the Workplace (3 credit hours)

This course will give students a skill that they will be able to use and benefit from for the rest of their lives: the ability to read, evaluate and understand newspapers, magazines, websites, journalistic materials, business writing, and journals. Students will learn to evaluate and analyze bias, propaganda, agenda, point-of-view, and misinformation. They will be able to interpret, organize and synthesize information from various sources to achieve a specific purpose with clarity and depth.

Prerequisite: ENGL101

Mathematics

MATH20 Calculus – I (3 credit hours)
(GE in Mathematics area)

This course is the first of a series in calculus designed for students to build a fundamental background in calculus and to learn its applications to basic problems. Topics include functions, limits, continuous functions, derivatives and applications, antiderivatives, composite functions and chain rules, graphing techniques using derivatives, implicit differentiation, finite integrals, and fundamental theorems of calculus.

Prerequisite: Pre-calculus subjects

MATH202 Calculus – II (3 credit hours)

This course is the second of the calculus series designed for students to understand integration techniques and extend the differentiation notion and methods to functions of multiple variables. Topics include logarithmic and exponential functions and their derivatives, inverse trigonometric functions, derivatives, as well as L'Hopital's rule, integration techniques and their applications, sequence, series, partial derivatives, and improper integrals.

Prerequisite: MATH201

MATH203 Linear Algebra (3 credit hours)

Linear algebra is one of the topics necessary to prepare students for higher-level math courses such as differential equations. It is also relevant to computer science and business students interested in data science since linear problems are often the simplest models of the natural world. In this course, students will learn the language, concepts, and techniques from the ground up, beginning with the geometric representation of systems by equations and progressing to the manipulation of abstract ideas such as singular value decomposition.

Prerequisite: MATH201

MATH208 Probability and Statistics (3 credit hours)

(GE in Mathematics area)

This course is designed for students to understand the concepts, theory, and applications of probability and statistics. Topics include permutation, combination, random variables, distribution, means and variance, normal distribution, random sampling, estimation, confidence interval, hypothesis testing, linear correlation, and regression.

Prerequisite: Pre-calculus subjects

Physics and Physical Sciences

PHYS101 Introduction to Physical Sciences (3 credit hours)

(GE in Sciences area)

This is an introductory course to expose the students to physical science subjects, including the basics of astronomy, chemistry, earth science, and physics.

***Prerequisite*:** Pre-calculus subjects

PHYS201 Physics – I (3 credit hours)

This course is designed to be the first of a series in physics for engineering students. Topics include vectors, motion and Newton's laws, gravitation, work and energy, momentum, mechanics of rigid bodies, oscillations, kinetic theory of gases, waves and sound, and thermodynamics. Laboratory practices are conducted formally each week.

Prerequisite/Corequisite: MATH201/PHYS201L

PHYS201L Physics Lab – I (1 credit hour)

This course is designed to be taken concurrently with the PHYS201 Physics - I course. The student first learns to use the general measuring equipment, the proper experimental procedures, and lab safety issues. The student is expected to gain skills in data analysis and lab report writing throughout the semester. Lab topics include measurements of position and velocity, kinematics, Newton's laws of motion, energy, momentum, conservation laws of energy and momentum, collisions, torque, rotational dynamics, waves, and thermodynamic behaviors.

Prerequisite/Corequisite: MATH201/PHYS201

PHYS202 Physics – II (3 credit hours)

This course is the second of a series in physics for engineering students. Topics include Coulomb's law and electric fields, currents and DC circuits, magnetic fields, time-varying EM fields, AC circuits, optics, interference, diffraction, and an introduction to modern physics. Laboratory practices are conducted formally each week.

Prerequisite/Corequisite: PHYS201/PHYS202L

PHYS202L Physics Lab – II (1 credit hour)

This course is designed to be taken with the PHYS202 Physics – II course. The student learns to use electrical measuring equipment to conduct the first of several experiments related to electromagnetism. Lab safety, as well as skills in data analysis and lab report writing, are stressed. Lab topics include measurement of electric field and potential, simple circuits, resistors, DC circuits, Kirchhoff's laws, capacitors, RC circuits, magnetic effects, inductors, AC circuits, electromagnetic induction, RLC circuits, geometrical optics, lenses, and light as a wave.

Prerequisite/Corequisite: PHYS201L/PHYS202

Social Science

(GE in Social Sciences area)

SOC201 California History (3 credit hours)

This course is designed to expose the students to the uniqueness of California's history and its evolution. Topics include the social, economic, and political development of the “Golden State” over the last three centuries, spanning the Native American, Spanish, Mexican, and American periods. Forms of study include lectures, case studies, and field trips for research.

PSY210 Introduction to Psychology (3 credit hours)

This psychology course reflects on theories and concepts of behavior and processes of the mind. Students will be introduced to topics such as motivation, emotion, personality, social behavior, perception, learning, and development. Different areas of psychology will be examined, such as cognitive, forensic, social, and developmental psychology. Additional topics may include environmental and biological factors affecting behavior, adaptation to stress and adversity, common disorders, experimental methods, and current research trends, among others.

PSY450 Cyberpsychology: Understanding Human Behavior in the Digital Age

Explore how digital technologies shape human behavior identity, relationships, mental health, and society. This interdisciplinary course examines online behavior through psychological and ethical lenses, covering topics like social media, cyberbullying, digital addiction, AI, VR, UX, and algorithmic bias. Students engage in weekly reflections, discussions, and hands-on projects, culminating in a final design promoting digital well-being or equity. Open to students from all disciplines; no prerequisites.

SOC215 Introduction to Sociology (3 credit hours)

This course provides a study of culture, social organization, and social relations. Additional topics include the major social problems in society, with an emphasis on how those problems are interrelated and the role of society in their creation and perpetuation. Issues and problems related to cross-culture and diversity will also be addressed.

SOC235 Multiculturalism in the United States (3 credit hours)

This course looks into various aspects of multiculturalism in American society, exploring issues related to race, ethnicity, gender, sexual orientation, disability, and other social group identities.

SOC250 Public Administration (3 credit hours)

This course serves as an introduction to public administration. Early key thinkers in the development of public administration will be examined. During the semester, topics such as public policy formation, public management, human resources, reinvention, privatization, e-government, public finance, performance measurement, and ethics will be reviewed. Students will become familiar with the primary issues and challenges facing public administrators today.

SOC260 Civilization and Urbanization (3 credit hours)

This is an introductory course designed to cover the 5,000-year shift from rural to urban throughout the world. The city is civilization's greatest work of art, but it has many challenges. The ancient walled cities, utopian writings, urban theories, religious experiments, English Garden Cities and new towns, American Greenbelt Towns, company towns, flight to the suburbs, neo-traditional planning, the New Urbanism, and current sustainable development, Smart Growth, and the more recent Greening and Healthy Cities will be described, and the actual city and regional planning practices shown.

SOC275 The American Experience (3 credit hours)

This course is designed to guide the students in examining the 20th-century rise of the United States as a modern multiethnic society with emphasis on the socioeconomic and political forces that have shaped its development.

HIST340 Modern American History (3 units)

This course covers the development of the United States from post–Civil War (1865) to the present. Students will further develop their historical research, writing, critical thinking, and presentation skills throughout this course. Covered topics start with the 1800's Reconstruction, immigration, industrialization, western expansion, and American urbanization, followed by the 20th century's World War I, the Great Depression, the New Deal, World War 2, Korean War, baby boom generation, Vietnam War, civil rights movement, and globalization. The course concludes with the 21st century, including the impact of September 11, 2001, terrorism, and modern technology.

HIST400 Early American History (3 credit hours)

This course is designed to lead the students to examine the early periods of American history that shaped the development of the nation, including America before Columbus, European expansion, the founding era and Revolution, the Constitution and the New Republic, and subsequent periods of civic and political growth up to the Civil War.

Prerequisite: ENGL101

SOC450 Emotional Intelligence (3 credit hours)

Emotional intelligence (EI), or emotional quotient (EQ), defines the skills or capacity to recognize one's own emotions and those of others and how to control these emotions. In this course, the students will learn about EQ and how to manage interpersonal relations and why it is important in their life and career because, in recent years, EQ has become a major indicator of achievement. They will learn how to increase their EQ by developing their abilities to perceive, use, understand, and manage emotions. EQ is a type of intelligence that, unlike IQ, can be increased, and its benefits are apparent in one's life and career. Knowing yourself is the essence of EQ. Students will learn about themselves by assessing their EQ at the beginning of the class and at the end of the term to see if any improvement took place.

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Engineering – Undergraduate Program Course Numbering and Descriptions

For general education, lower-division courses are numbered in the 100s and 200s, and upper-division courses are numbered in the 300s and 400s.

Course No.	Description
100–199	Freshman-level courses
200–299	Sophomore-level courses
300–399	Junior-level courses
400–499	Senior-level courses
450–499	Senior-level specialized skills courses taken for undergraduate-level credit

Courses are listed by subject: Business, Computer Systems Engineering, Computer Science, Curricular Practicum, and Professional Development. Each course description is followed by any prerequisite or corequisite information.

Each **1-credit-hour lab** course requires at least 2 contact hours of lab work each week. Each **1 credit hour of a practicum course** requires at least 45 contact hours of practical experience related to the student's program curriculum.

Business

BUS450 Professional and Technical Writing (3 credit hours)

This course presents students with practical instructions about communicating in different kinds of academic and workplace environments, as well as professional/technical communities. Students will learn how to organize and produce common professional writing work, such as technical reports, white papers, proposals, and theses. The course also covers different forms of effective writing, writing styles, approaches, formats, and citations of referenced materials.

Computer Systems Engineering

CE305 Computer Organization (3 credit hours)

This course is designed to provide a fundamental understanding of the issues and challenges involved in designing and implementing modern computer systems. The primary goal is to help students become more skilled in their understanding of computer systems, including how the hardware and software interact with each other. This course will also provide an understanding of where computers come from and where they are going, as well as an understanding of their strengths and weaknesses, such as why compiled code will always execute faster than JAVA code. Subjects will include RISC vs. CISC CPU design approach, instruction sets, pipelining, instruction scheduling (branch prediction, speculative and out-of-order execution, etc.), cache, and storage hierarchy design. Additional key focuses will be on modern I/O architectures such as PCI, PCI-X, SATA, SCSI, and USB, among others, and their importance for performance and compatibility.

CE450 Fundamentals of Embedded Engineering (3 credit hours)

This is the first in a series of embedded systems courses designed for students who are interested in learning real-time embedded systems and practicing real-time programming of embedded systems. Topics include hardware issues such as platform, microprocessors commonly used in these systems and how a microprocessor works in such systems; the concept of memory, registers, I/O; interrupt generation and handling in an embedded system; the concept of real-time programming, multitasking, concurrency, mutual exclusion; overview of real-time kernel/OS, drivers; system initialization and startup, and debug issues. Hands-on exercises are required.

Prerequisite/Corequisite: CS250/CE450L

CE450L Embedded Engineering Lab (1 credit hour)

This is a drill course designed to be taken concurrently with the CE450 Fundamentals of Embedded Engineering course. The students gain hands-on experience with embedded systems programming and design. They are also guided to work on projects involving control systems.

Prerequisite/Corequisite: CS250L/CE450

Computer Science

CS200 Discrete Logic (3 credit hours)

This course introduces students to the Linux operating system and its environment. Topics covered include core Linux concepts, shell commands, the visual editor, file manipulation and security, utility commands, shell features and environment customization, and use of the online manual. Students will learn to manage user processes and jobs, and gain an introduction to regular expressions and their application using powerful tools like grep, sed, and awk.

The course also explores basic shell programming techniques, large file handling, and user environment customization. Students will become familiar with various Linux shells, including Bash, Bourne, and Korn, and learn how to write shell scripts to automate routine tasks related to software development and testing.

Prerequisite: Pre-calculus subjects

CS230 Linux & Shell Scripting (3 credit hours)

This course is designed to familiarize the students with the Linux environment. Topics include concepts of the Linux operating system, Shell commands, Visual editor, file manipulation and securities, Linux utility commands, shell features and shell environment, online manual, controlling user processes and managing jobs, the introduction of regular expression and its usage with grep, sed, and awk power utilities, basic shell programming techniques, large file management, and the user programming environment customization. Students are also introduced to Linux shells (bash, Bourne, and Korn), shell programming, basic Linux file systems, and resource management. The students will be able to write shell scripts to accomplish routine tasks for software development and testing. Hands-on exercises are required.

Corequisite: CS230L

CS230L Linux & Shell Scripting Lab (1 credit hour)

This course is designed to be taken concurrently with the CS230 Linux & Shell Scripting course. The students gain hands-on experience with Unix/Linux commands, vi editor, Linux utility, shell scripting/programming, security issues, managing long files, and customization of user environment.

Corequisite: CS230

CS250 Introduction to Programming (3 credit hours)

This course is an introduction to computer science using Python programming language. Major topics covered include defining and analyzing problems, developing algorithms, implementation, debugging, documentation of programs, coverage of basic algorithms, programming concepts, and data types. Students will write computer programs that include control structures, iteration, methods, argument passing, and classes.

Corequisite: CS250L

CS250L Introduction to Programming Lab (1 credit hour)

This course is designed to be taken concurrently with the CS250 Introduction to Programming course. It is aimed at students new to the Python language who may or may not have experience with other programming languages. Students will learn (a) how Python works and its place in the world of programming languages, (b) to work with and manipulate strings, (c) to perform math operations, (d) to work with Python sequences, (e) to collect user input and output results, (f) flow control processing, (g) to write to, and read from files, (h) to write functions, and (i) to handle exceptions.

Corequisite: CS250

CS350 Data Structures (3 credit hours)

This course is designed to teach efficient use of data structures and algorithms to solve problems. Students study the logical relationship between data structures associated with a problem and physical representation. Topics include introduction to algorithms and data organization, arrays, stacks, queues, trees, graphs, sorting, hashing, and heap structures. Hands-on exercises are required.

Prerequisite/Corequisite: CS250/CS350L

CS350L Data Structures Lab (1 credit hour)

This course is designed to be taken concurrently with the CS350 Data Structures course. C language, a structured programming language, is further investigated. Topics include pointer structure, structure and union, stack, queue, linked list, sort, binary tree, and heaps.

Prerequisite/Corequisite: CS250L/CS350

CS360 Programming in C and C++ (3 credit hours)

This course is designed to develop students' skills in designing, coding, and documenting application programs using the C and C++ programming languages. Emphasis is placed on defining design objectives, criteria, and specifications, as well as the processes of synthesis, analysis, construction, testing, and evaluation of open-ended programming problem

Topics include an introduction to procedural programming in C and object-oriented programming in C++. Key concepts covered are data types, expressions, statements, functions, program scope, run-time memory allocation, function overloading, template functions, class mechanisms, inheritance, and transitioning from C to C++.***Prerequisite/Corequisite:*** CS250/CS360L

CS360L Programming in C and C++ Lab (1 credit hour)

This course is designed to be taken concurrently with the CS360 Programming in C and C++ course to practice and develop programming skills in both C and C++.

Prerequisite/Corequisite: CS250L/CS360

CS380 Operating Systems (3 credit hours)

This course covers the fundamental concepts and implementation techniques of modern operating systems. Topics include processes, threads, concurrency, memory management, file systems, I/O systems, security, and OS virtualization. Popular operating systems will be selected for case studies, including Linux/UNIX, Windows, Android, and VMWare hypervisors. Hands-on exercises and projects are required.

Prerequisite: CS250

CS453 Compiler Design (3 credit hours)

This course is designed to give students a fundamental knowledge of compilers and interpreters for modern computer languages. Topics include a study of modern computer languages, regular expressions, lexical analysis, parsing techniques, context-free grammar, and syntax-directed translation. Hands-on exercises and semester projects are required.

Prerequisite: CS350

CS455 Algorithms & Structured Programming (3 credit hours)

This course introduces students to the design, analysis, and implementation of algorithms to solve engineering problems using an object-oriented programming language. It covers the common algorithms, algorithmic complexity, and data structures used to solve these problems. The course concentrates on the design of algorithms and the analysis of their efficiency.

Prerequisite: CS350

CS457 Data Modeling and Implementation Techniques (3 credit hours)

This is the first of a series of courses designed to teach relational database concepts, design, and applications. Topics include database architecture, relational model, structured query language (SQL), data manipulation language (DML), data definition language (DDL), database design, ER modeling, database normalization, denormalization, and physical database design. Popular

database systems, such as Oracle and Microsoft SQL servers, are used for hands-on exercises and projects.

Prerequisite/Corequisite: CS250/CS457L

CS457L Database Technologies Lab (1 credit hour)

This is a drill course designed to be taken concurrently with the CS457 Data Modeling and Implementation Techniques course. The students gain hands-on experience in database applications using popular database systems, including Oracle and Microsoft SQL servers. They are also guided in working on database design projects.

Prerequisite/Corequisite: CS250L/CS457

CS470 Network Engineering and Management (3 credit hours)

This course is designed to introduce network communications. Topics include network-layered models (OSI, TCP/IP), architecture, principles, service models and protocols, data communication basics, switching, routing, security, network management, and wireless and mobile networks. Modern Internet technologies and implementations are presented in case studies. Hands-on exercises are required.

***Prerequisite*:** CS250

CS477 Ethical Hacking and Penetration Testing (3 credit hours)

An ethical hacker is usually employed by an organization that trusts him or her to attempt to penetrate networks or computer systems, using the same methods as a hacker, for the purpose of finding and fixing computer security vulnerabilities. This course goes into computer hacking techniques in depth. The students leave with the ability to quantitatively assess and measure threats to information assets and discover where the organization is most vulnerable to hacking. This knowledge allows system administrators to deploy proactive countermeasures, stay ahead of information security developments, and exploit vulnerabilities.

Prerequisite: CS250

CS478 Blockchain Technology and Applications (3 credit hours)

This course explores the fundamentals and applications of blockchain technology, which is the transparent, secure, immutable, and distributed database used currently as the underlying technology for cryptocurrency. Types of blockchain will be introduced and studied with real-life cases. Through practical cases and research assignments, this course will introduce students to the workings and applications of this potentially disruptive technology and its potential impact on all aspects of the business world and society.

CS480 Java and Internet Applications (3 credit hours)

This course introduces students to programming in Java, with an emphasis on object-oriented concepts, graphical user interface (GUI) design, and the use of core Java libraries. Students will learn fundamental Java language features, including syntax, classes, inheritance, interfaces, and

reflection. Additional topics include graphics programming, event handling, Swing-based UI components, Java applets, exception handling, and working with streams and files.

Prerequisite/Corequisite: CS250 or CS360/CS480L

CS480L Java Programming Lab (1 credit hour)

This is a drill course designed to be taken concurrently with the CS480 Java and Internet Applications course. The students gain Java programming skills in this weekly lab course through hands-on exercises that normally correspond with the lecture material offered each week.

Prerequisite/Corequisite: CS250L or CS360L/CS480

CS481 Introduction to Machine Learning and Data Science (3 credit hours)

Data science is an interdisciplinary field that combines mathematics, statistics, programming languages, and specific domain knowledge. This course describes (1) the process of gaining knowledge and insights from data in both a structured and an unstructured way and (2) scientific methods, processes, algorithms, and systems that can be employed to analyze, design, develop, and implement solutions to challenging novel and existing data science problems.

Prerequisite: MATH208

CS483 Fundamentals of Artificial Intelligence (3 credit hours)

This course covers artificial intelligence (AI) applications in problem-solving, reasoning, planning, natural language understanding, computer vision, autonomous car navigation, machine learning, business intelligence, robot design, and so on. In order to solve AI problems, the major algorithms include machine learning, search, Markov decision processes, constraint satisfaction, graphical models, and logic. The main goal of this course is to equip students with the tools in the Python library to tackle a variety of AI problems in industries.

Prerequisite: CS250

CS483L Artificial Intelligence & Machine Learning Lab (1 credit hour)

Students will learn Python programming in the Google Colab platform with numpy, pandas, matplotlib, scikit-learn, seaborn, tensorflow models, and Keras API to implement algorithms covered in the lecture from different raw dataset sources. And they will have the chance to build systems for several hands-on design projects. In a two-hour lab session, students will become familiar with algorithm functions in the aforementioned libraries to implement different data processes in machine learning, search, Markov decision processes, constraint satisfaction, graphical models, and logic and to optimize design systems by plotting data process curves and error analysis in the model.

Prerequisite: CS250L

CS485 JavaScript and Internet Programming (3 credit hours)

This course is designed to provide students with advanced programming knowledge and skills for application development on the Internet. Students study both client-side and server-side scripting, including HTML, JavaScript, and CSS, to develop interactive and responsive websites. Other topics

covered include jQuery, Bootstrap, Node.js Express Framework, RESTful API, MongoDB (NoSQL), and various JavaScript frameworks such as Angular and React. Hands-on exercises are required.

Prerequisite: CS250

CS487 Object-Oriented Design and Implementations (3 credit hours)

This course is designed to use an object-oriented programming language to achieve the goal of teaching the students the design methodology for algorithm development. The objective is to develop the students' programming ability with proper logical and object-oriented thinking processes, as well as basic design patterns. The course covers two main topics: (1) problem specification and analysis: understand the problem, analyze it, and translate human thinking into a computer program, and (2) object-oriented design and analysis: understand data abstraction, encapsulation, aggregation, and inheritance. These concepts are the foundation for object-oriented programming languages such as Python, Java, C++, and C#. Hands-on practice using Python is required.

Corequisite: CS250

CS494 Senior Capstone Project – I (3 credit hours)

This is the first part of the senior capstone project series. The senior capstone project course is designed to develop the creativity of every senior graduating in computer science through the exercise of the design effort and implementation skills of a self-selected project. The design approach must employ modern design techniques and methodologies in the related fields that were acquired during the course of the program study. Completion of the project entails (1) proper research on relevant topics, (2) formulation of a design problem statement, (3) design specifications, (4) consideration of alternative solutions, (5) a development plan, (6) actual implementation, and (7) submission of a final report. The student must discuss with and follow the guidelines provided by the instructor through the period of research, implementation, testing, report writing, and related procedures.

***Prerequisite*:** Must be in the senior year of the program.

CS495 Senior Capstone Project – II (3 credit hours)

This is the second part of the senior capstone project series. The student may choose to continue to work on the project developed during the CS494 Senior Capstone Project - I course. The goal is to allow students to enhance or expand their projects to gain more experience in product development, as well as apply additional knowledge/skills acquired during the course of program study or through individual research. On completion of the project, the student is required to conduct an open-forum presentation of the project and submit a professional report.

***Prerequisite*:** CS494

Curricular Practicum

CPT401 Curricular Practicum (1 credit hour)

Curricular practicum, or curricular practical training, is a supervised practical experience that is the application of previously studied theory. The curricular practicum must provide students with valuable learning experience and must significantly increase their knowledge in their program of study. It is defined as alternative work/study, internship, cooperative education, or any other type of required internship or practicum that is offered by sponsoring employers through cooperative agreements with the school, and the course is an integral part of an established curriculum. At least three hours of work in a practical setting has the credit equivalency of one hour of classroom lecture (1 credit hour). To be eligible to take this course, the student must be in good standing, have completed at least two semesters of coursework required in their degree program, and have obtained a written agreement that outlines the arrangement between the institution and the practicum site (including specific learning objectives, course requirements, and evaluation criteria), and received approval by a designated advisor. F-1 international students must follow additional rules required by the U.S. Immigration and Customs Enforcement. The student must use SFBU's online tool to submit their application to take this course before meeting with a designated advisor to assess eligibility. Information and instructions concerning this course are provided in the application form. This is a part-time practicum course taken by the undergraduate student to work no more than twenty hours each week during the approved practicum period. Failure in this course will prevent the student from taking any curricular practicum course afterward.

Prerequisite: Refer to the instructions on the application and agreement documents.

CPT402 Curricular Practicum (2 credit hours)

Curricular practicum, or curricular practical training, is a supervised practical experience that is the application of previously studied theory. The curricular practicum must provide students with valuable learning experience and must significantly increase their knowledge in their program of study. It is defined as alternative work/study, internship, cooperative education, or any other type of required internship or practicum that is offered by sponsoring employers through cooperative agreements with the school, and the course is an integral part of an established curriculum. At least three hours of work in a practical setting has the credit equivalency of one hour of classroom lecture (1 credit hour). To be eligible to take this course, the student must be in good standing, have completed at least two semesters of coursework required in their degree program, and have obtained a written agreement that outlines the arrangement between the institution and the practicum site (including specific learning objectives, course requirements, and evaluation criteria), and received approval by a designated advisor. F-1 International students must follow additional rules required by the U.S. Immigration and Customs Enforcement. The student must use SFBU's online tool to submit their application to take this course before meeting with a designated advisor to assess eligibility. Information and instructions concerning this course are provided in the application form. This is a full-time practicum course taken by the undergraduate student to work more than twenty hours but not to exceed forty hours each week during the approved practicum period. Failure in this course will prevent the student from taking any curricular practicum course afterward.

Prerequisite: Refer to the instructions on the application and agreement documents.

Professional Development

P450 Career Development (1 credit hour)

This course is designed for the students to take in preparation for becoming working professionals. Topics include effective communication strategies, emotional intelligence, diversity and cultural awareness, professional behavior, and interview skills.

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Engineering – Graduate Programs Course Numbering and Descriptions

Master's degree courses are numbered in the 500s. Each master's degree program allows for a limited number of credits for 400-level courses with a "G" suffix.

Course No.	*Description*
450G–499G	Cross-listed specialized skills courses taken for graduate-level credits
500–599	Graduate-level courses

For information on prerequisite subjects numbered below 450, refer to the section Engineering — Undergraduate Programs Course Numbering and Descriptions.

Courses are listed by subjects: Embedded Systems Engineering, Computer Science, Curricular Practicum, Data Science, Electrical Engineering, and Professional Development. Each course description is followed by any prerequisite or corequisite information.

Each **1-credit-hour lab course** requires at least 2 contact hours of lab work each week. Each **1 credit hour of a practicum course** requires at least 45 contact hours of practical experience related to the student's program curriculum.

Embedded Systems Engineering

CE450G Fundamentals of Embedded Engineering (3 credit hours)

This is the first in a series of embedded systems courses designed for students who are interested in learning real-time embedded systems and practicing real-time programming of embedded systems. Topics include hardware issues such as platform, microprocessors commonly used in these systems and how a microprocessor works in such systems; the concept of memory, registers, I/O; interrupt generation and handling in an embedded system; the concept of real-time programming, multitasking, concurrency, mutual exclusion; overview of real-time kernel/OS, drivers; system initialization and startup, and debug issues. Hands-on exercises are required.

Prerequisite/Corequisite: CS250/CE450LG

CE450LG Embedded Engineering Lab (1 credit hour)

This is a drill course designed to be taken concurrently with the CE450G Fundamentals of Embedded Engineering course. The students gain hands-on experience with embedded systems programming and design. They are also guided to work on projects involving control systems.

Prerequisite/Corequisite: CS250L/CE450G

CE521 Real-Time Systems and Programming (3 credit hours)

This is the second in the embedded systems series designed for students who are interested in learning real-time embedded systems and practicing real-time programming of embedded systems. By examining an off-the-shelf real-time operating system, students will gain hands-on experience in real-time operating system programming and implementations. Specific topics include a review of embedded system design, the concept of real-time systems, real-time specification and design techniques, real-time kernels, system performance analysis, memory management, task management, time management, synchronization of inter-task communication, queuing models, real-time operating system tools for embedded systems, and real-time programming examples. Hands-on exercises are required.

Prerequisite: CE450

CE522 Embedded Design in Networking Environment (3 credit hours)

This course is designed for the students to learn protocol stack implementation/porting in a real-time operating system (RTOS) kernel environment. Students learn the concept of network protocol stack implementation/porting, embedded real-time system software architecture, and real-time operating systems. They also learn to design and write programs as a collection of independent and concurrent tasks, non-preemptive and preemptive multitasking, task scheduling, and task synchronization and intertask communication, including semaphores and message queues. Industry-standard RTOS will be used for practice and projects.

Prerequisites: CE450

CE523 Embedded Design in Device Driver Environment (3 credit hours)

This course investigates the operating system (Windows NT, Linux, or Unix) components that interact with device drivers, the device driver building and debugging process, device driver architecture, functionality, and the relevant kernel APIs. Topics include operating system architecture; I/O API; operating system kernel; building, loading, and debugging device drivers; device driver entry points; device driver data structures; I/O request processing; plug, play and power management; interrupt-timers; memory management; direct memory access; and timing. The goal of the course is to present comprehensive coverage of the operating system kernel, HAL, device drivers, and the related APIs. On completion of the course, the student should be able to develop, build, install, and test basic device drivers, as well as to port existing drivers from one operating system to another. Hands-on practice is required.

Prerequisite: CE450

CE530 Embedded Software Design in Linux (3 credit hours)

This course prepares students to enter the challenging world of embedded Linux. It covers the following key topics: comparing Linux and traditional embedded environments, comparing leading embedded Linux processors, understanding the details of the Linux kernel initialization process, learning the basic concepts about Linux drivers, learning about the special role of bootloaders in embedded Linux systems with specific emphasis on U-Boot, using embedded Linux file systems, understanding the Memory Technology Devices subsystem for flash (and other) memory devices, mastering debugging tools such as gdb, KGDB, learning many tips and techniques for debugging within the Linux kernel, learning how to maximize productivity in cross-development environments, learning to prepare an entire development environment (including TFTP, DHCP, and NFS target servers), and learning to configure, build, and initialize BusyBox to support a set of unique requirements. Hands-on exercises are required.

***Prerequisite*:** CE450

Computer Science

CS453G Compiler Design (3 credit hours)

This course is designed to give students a fundamental knowledge of compilers and interpreters for modern computer languages. Topics include a study of modern computer languages, regular expressions, lexical analysis, parsing techniques, context-free grammar, and syntax-directed translation. Hands-on exercises and semester projects are required.

Prerequisite: CS350

CS455G Algorithms & Structured Programming (3 credit hours)

This course introduces students to the design, analysis, and implementation of algorithms to solve engineering problems using an object-oriented programming language. It covers the common algorithms, algorithmic complexity, and data structures used to solve these problems. The course concentrates on the design of algorithms and the analysis of their efficiency.

Prerequisite: CS350

CS457G Data Modeling and Implementation Techniques (3 credit hours)

This is the first of a series of courses designed to teach relational database concepts, design, and applications. Topics include database architecture, relational models, structured query language (SQL), data manipulation language (DML), data definition language (DDL), database design, ER modeling, database normalization, denormalization, and physical database design. Popular database systems, such as Oracle and Microsoft SQL servers, are used for hands-on exercises and projects.

Prerequisite/Corequisite: CS250/CS457LG

CS457LG Database Technologies Lab (1 credit hour)

This drill course is designed to be taken concurrently with the CS457 Data Modeling and Implementation Techniques course. The students gain hands-on experience in database applications using popular database systems, including Oracle and Microsoft SQL servers. They are also guided to work on database design projects.

Prerequisite/Corequisite: CS250L/CS457G

CS470G Network Engineering and Management (3 credit hours)

This course is designed to introduce network communications. Topics include network-layered models (OSI, TCP/IP), architecture, principles, service models and protocols, data communication basics, switching, routing, security, network management, and wireless and mobile networks. Modern Internet technologies and implementations are presented in case studies. Hands-on exercises are required.

***Prerequisite*:** CS250

CS477G Ethical Hacking and Penetration Testing (3 credit hours)

An ethical hacker is usually employed by an organization that trusts him or her to attempt to penetrate networks or computer systems, using the same methods as a hacker, for the purpose of finding and fixing computer security vulnerabilities. This course goes into computer hacking techniques in depth. The students leave with the ability to quantitatively assess and measure threats to information assets and discover where the organization is most vulnerable to hacking. This knowledge allows system administrators to deploy proactive countermeasures, stay ahead of information security developments, and exploit vulnerabilities.

Prerequisite: CS250

CS478G Blockchain Technology and Applications (3 credit hours)

This course explores the fundamentals and applications of blockchain technology, which is the transparent, secure, immutable, and distributed database used currently as the underlying technology for cryptocurrency. Types of blockchain will be introduced and studied with real-life cases. Through practical cases and research assignments, this course will introduce students to the workings and applications of this potentially disruptive technology and its potential impact on all aspects of the business world and society.

CS480G Java and Internet Applications (3 credit hours)

This course introduces students to the Java language, programming with object-oriented construct, GUI design and graphics programming, and core Java libraries. Students will learn Java language basics such as syntax and classes, inheritance, interfaces, reflection, graphics programming, event handling, user-interface components with Swing, Java applets, exception handling, stream, and files. Hands-on exercises are required.

Prerequisite/Corequisite: CS250 or CS360/CS480LG

CS480LG Java Programming Lab (1 credit hour)

This is a drill course designed to be taken concurrently with the CS480 Java and Internet Applications course. The students gain Java programming skills in this weekly lab course through hands-on exercises that normally correspond with the lecture material offered each week.

Prerequisite/Corequisite: CS250 or CS360L/CS480G

CS481G Introduction to Machine Learning and Data Science (3 credit hours)

Data science is an interdisciplinary field that combines mathematics, statistics, programming languages, and specific domain knowledge. This course describes (1) the process of gaining knowledge and insights from data in both a structured and an unstructured way and (2) scientific methods, processes, algorithms, and systems that can be employed to design, develop, and implement solutions to challenging novel and existing data science problems.

Prerequisite: MATH208

CS483G Fundamentals of Artificial Intelligence (3 credit hours)

This course covers artificial intelligence (AI) applications in problem-solving, reasoning, planning, natural language understanding, computer vision, autonomous car navigation, machine learning, business intelligence, robot design, and so on. In order to solve (AI) problems, the major algorithms include machine learning, search, Markov decision processes, constraint satisfaction, graphical models, and logic. The main goal of this course is to equip students with the tools in the Python library to tackle a variety of AI problems in industries.

Prerequisite: CS250

CS483LG Artificial Intelligence & Machine Learning Lab (1 credit hour)

Students will learn Python programming in the Google Colab platform with numpy, pandas, matplotlib, scikit-learn, seaborn, tensorflow models and Keras API to implement algorithms covered in the lecture from different raw dataset sources. And they will have the chance to build systems for several hands-on design projects. In a two-hour lab session, students will become familiar with algorithm functions in the aforementioned libraries to implement different data processes in machine learning, search, Markov decision processes, constraint satisfaction, graphical models, and logic and to optimize design system by plotting data process curves and error analysis in the model.

Prerequisite: CS250L

CS485G JavaScript and Internet Programming (3 credit hours)

This course is designed to provide students with advanced programming knowledge and skills for application development on the Internet. Students study both client-side and server-side scripting, including HTML, JavaScript, and CSS, to develop interactive and responsive websites. Other topics covered include jQuery, Bootstrap, Node.js Express Framework, RESTful API, MongoDB (NoSQL), and various JavaScript frameworks such as Angular and React. Hands-on exercises are required.

Prerequisite: CS250

CS500 Object-Oriented Design in Python (3 credit hours)

This course is designed to use object-oriented programming language to achieve the goal of teaching the students the object-oriented design methodology for software development. The objective is to develop the students' programming ability with proper logical and object-oriented thinking processes, as well as software design patterns. The course covers three main topics: (1) object-oriented design and analysis: requirement analysis, design process, data abstraction, encapsulation, aggregation, and inheritance; (2) design patterns: reusable solutions to commonly occurring problems such as Abstract Factory, Observer, Command, Decorator, Adaptor, Iterator, and State; and (3) Python language: data types, control structures, functions, parameter passing, library functions, lists, tuples and dictionaries, I/O, modules, functional programming, and advanced python syntax. Hands-on practices are required.

Prerequisite/Corequisite: CS250/CS500L

CS500L Object-Oriented Design in Python Lab (1 credit hour)

This course is designed to be taken concurrently with the CS500 Object-oriented Analysis and Design in Python course to practice object-oriented design and develop programming skills in Python.

Prerequisite/Corequisite: CS250/CS500

CS501 Practical Application of Algorithms (3 credit hours)

This course is designed to expand a student's knowledge of algorithms by concentrating on the practical application to solve real-world computational problems. Students will be trained in the process of "Algorithmic Thinking," allowing them to develop a good conceptual understanding and improve their ability to solve challenging problems. Students will learn how to implement abstract algorithmic thoughts in programs, explain them to others, and formulate simpler, more efficient solutions to real-life problems faced during an interview or in the workplace.

Prerequisite: CS250

CS510 Advanced UNIX/Linux Programming (3 credit hours)

This course is designed for students to gain fundamental knowledge of and hands-on experience with programming in the UNIX/Linux environment. Students will learn to program in C with UNIX/Linux system calls and will learn about other advanced topics such as the UNIX file system, process control, signals, and inter-process communications. Students are required to do a term project with a substantial amount of programming. On completion of this course, students should be able to develop real-world UNIX/Linux applications. Hands-on practice and projects are required.

Prerequisites: CS230 and CS250

CS515 UNIX/Linux Network Programming (3 credit hours)

This course is designed for graduate students to gain hands-on experience in UNIX/Linux network programming. The students will learn to develop UNIX/Linux network applications using a number of UNIX/Linux network programming interface techniques including Sockets, XTI, and RPC. Topics

include an overview of transport layer (TCP/UDP), TCP sockets, UDP sockets, threads, and client-server design, XTI, RPC, and Streams. Hands-on exercises and projects are required.

***Prerequisites*:** CS230 and CS250

CS521 Software Project Management (3 credit hours)

This course teaches students to apply current software development approaches to managing complex modern software projects. Practical strategies, tactics, and designs are discussed together with realistic exercises. Topics include software development process, project planning, requirements definition, design specification, usability engineering, verification and validation, project and change management, and process quality improvement. Students are required to participate in all course activities to develop a real-world software product.

***Prerequisite*:** CS250

CS522 Software Quality Assurance and Test Automation (3 credit hours)

This course teaches students to learn practical static and dynamic techniques that allow software development teams to engineer high-quality products. The course begins with an overview of modern software development approaches. It then introduces quality management and test development based on preventive and agile principles as well as quality risk analysis. It covers system, integration, performance, and automated testing techniques. Quality improvement models for software development and testing are discussed. Several test automation tools are demonstrated in class. Students gain hands-on experience through assignments and exercises and learn to evaluate real-world applications.

***Prerequisite*:** CS250

CS526 Advanced Web Programming (3 credit hours)

This course teaches students how to build modern web applications with web application frameworks. It helps students understand how the web application framework performs and shows students how to use various features of the framework to solve many problems in real-world development scenarios they are likely to face. In the process, students will learn how to work with HTML, CSS, JavaScript, the Object-relational Mapping Framework, and other web technologies. Students will start by learning core concepts such as the Model-View-Controller architectural pattern and then work their way toward advanced topics as well as mobile web development techniques.

Prerequisite: CS250 or CS480

CS531 Python Applications Programming (3 credit hours)

This course introduces the fundamental and advanced features of Python programming language and how to utilize them to develop Python applications. The students will start by learning about the development environment, basic syntax, variable types, basic operators, control flows and loops, functions, modules, files I/O, and exceptions. The course goes on to include advanced topics such as classes/objects, object-oriented programming, regular expressions, multithreading, interface with Linux commands, and C programs. On completion, the students will be able to

develop Python applications that involve CGI programming, database access, networking, XML processing, GUI programming, and functional programming.

Prerequisites: CS230 and CS500

CS532 Advanced Internet Programming and Design (3 credit hours)

This course is designed to give the students an in-depth understanding of Java programming techniques. The course focuses on advanced Java language features and packages that are essential for building a variety of application architectures. Topics include Java techniques of XML, JNI, thread, network programming, generic programming concepts, and internalization. On completion of this course, the students should be well prepared to create enterprise-wide, Java-centric solutions to client/server problems involving Java and networks. Each technology topic will cover its uses, implementation, and language issues. Students are required to implement a project for each Java technique. Hands-on exercises are required.

Prerequisite: CS480

CS535 Network Security Fundamentals (3 credit hours)

This course deals with security issues on the Internet and the web. Major topics include issues related to Internet infrastructure and applications running on the Internet, techniques to reduce security risks, and an introduction to the role of security as an enabling technology for electronic commerce. The course includes an overview of Internet and web security, its applications and legal issues, encryption and cryptography, SSL and browsers, web servers, and Java security.

Prerequisite: CS250

CS540 Advanced Database Administration (3 credit hours)

This course provides an in-depth understanding of the Oracle Database Management System. The emphasis is on the latest Oracle database architecture, database configuration and administration. Topics include logical/physical database layout, database server processes, database creation, various database physical objects, client/server configuration, multithreaded server configuration, database storage management, database security, database utilities, database monitoring, partitions, and database backup/recovery methods. Hands-on practice is required.

Prerequisite: CS457

CS547 Advanced Database Design and Analysis (3 credit hours)

This course is intended for graduate students to further explore database server development and database tuning. The course specifically details procedural extensions to SQL to develop stored procedures, functions, packages, and database triggers. In addition, it covers database performance tuning from an application development point of view by exploring query optimizers, database hints, and various database access methods. Hands-on exercises are required.

***Prerequisite*:** CS457

CS548 Web Services Techniques and REST Technologies (3 credit hours)

This course covers the fundamental concepts of the 3-tier model commonly used in Enterprise Application development. Topics include the Spring Framework, JDBC with database applications, JPA (Java Persistence API), Hibernate, Spring MVC, Java Servlets, and JavaBeans. In addition, the students will learn the best-practice development approach using the Sprint Framework with JDBC or ORM (Object Relational Mapping) tools to map business domain object models to the underlying relational database. At the end of this course, the students shall have a fresh view of both the fundamental and advanced skills needed to implement large-scale enterprise systems. Hands-on exercises are an integral part of the course.

Prerequisite: CS480

CS550 Machine Learning and Business Intelligence (3 credit hours)

This course introduces methods and techniques for using stored business data to make business decisions. The student will learn data types, including operational or transactional data, such as data for sales, cost, and inventory; nonoperational data, such as forecast data and macroeconomic data; and metadata, as well as learn their patterns, associations, or relationships, and how to use this information for decision-making. Modern data warehouse concepts will also be introduced. Specific examples of businesses using data mining techniques will be given in the course. The student is required to work on course projects by using modern data analysis software and referring to cases studied.

Prerequisite: CS457

CS551 Mobile Computing for Android Mobile Devices (3 credit hours)

Google's Android mobile phone software platform may be the next major opportunity for application software developers. Android has the potential to remove the barriers to successful development and sales of a new generation of mobile phone application software. Just as PCs have created the markets for desktop and server software, Android will create a new market for mobile applications by providing a standard mobile phone application environment. This hands-on course focuses on developing applications for Android, including map-based applications, camera-based applications, SMS, and the like. Advanced development topics are also covered, including security, IPC, and certain advanced graphics and user interface techniques.

Prerequisite: CS500

CS556 Mobile Applications on iPhone Platform (3 credit hours)

This course provides an in-depth study of the design, development, and publication of object-oriented applications for the iPhone platform using Apple SDK. Students will learn to utilize Xcode, SwiftUI, and UIKit to create iOS apps for iPhones.

Prerequisite: CS360 or CS500

CS565 Advanced Network Management (3 credit hours)

This course is designed to give graduate students an in-depth understanding of and hands-on experience in the management of network systems and applications. Emphases are on simple

network management protocol (SNMP) management, MIB, management tools, systems, and applications. Current widely used industry applications will be used to demonstrate management concepts. Computer-based training software will be used to check/verify the students' network management skills in order to ensure they are prepared for the industry challenges. Topics include Network Management fundamentals; OSIMAN, SNMP, and TMN standards; RMON and ITU TMN architecture; inside structure and practical applications of SNMP, SNMP2, SNMP3, RMON, RMON2, and MIBs. Hands-on exercises are required.

Prerequisite: CS470

CS570 Big Data Processing & Analytics (3 credit hours)

This course aims to provide students with an understanding of the operating principles and hands-on experience with mainstream big data computing systems such as MapReduce, Hadoop, and, most recently, Apache Spark, a fast, in-memory distributed collections framework written in Scala. Applying these techniques to big data processing and analytic problems, such as PageRank, machining learning, and social network graph mining, will be discussed.

***Prerequisite*:** CS500

CS571 Cloud Computing Infrastructure (3 credit hours)

This course provides a comprehensive introduction to cloud computing infrastructure, covering key concepts such as cloud frameworks, design patterns, virtualization, and cloud-based applications. It then explores modern container technologies, with a focus on Docker and its role in application deployment.

Building on this foundation, the course delves into Kubernetes, a leading open-source container orchestration platform that has transformed how applications are built, deployed, and managed in the cloud. Students will examine how Kubernetes supports scalable, resilient application development and why it has become a critical tool in cloud-native computing.

***Prerequisite*:** CS500

CS572 Blockchain Development (3 credit hours)

This course introduces the fundamentals of blockchain technology and the foundational concepts required to design and develop decentralized applications. Students will explore the principles of distributed ledgers, consensus mechanisms, smart contracts, and the architecture of decentralized systems.

Through a series of guided exercises, students will learn how to design, implement, deploy, and evaluate decentralized applications that interact with smart contracts. The course emphasizes hands-on experience, allowing students to gain practical skills in building secure and functional blockchain-based solutions.

***Prerequisite*:** CS500

CS575 Network Analysis and Testing (3 credit hours)

This course covers computer network analysis, testing techniques, and experience-based strategies to isolate and solve network problems. Topics include wiring and cable testing issues, transmission encoding techniques, dissecting the IEEE 48-bit MAC address, the impact of different types of broadcast traffic, operational details and analysis considerations for switches, Ethernet and Token Ring operational details and analysis, the IEEE 802.2 LLC protocol, datagrams and routing, IP specifics, protocol analysis and troubleshooting, baselining throughput, and latency. Hands-on exercises using a protocol analyzer are required to reinforce the topics.

Prerequisite: CS250

CS581 Cloud Security (3 credit hours)

This course covers the basics of cloud infrastructure technologies such as computers, storage, containers, serverless, IAM, asset management, and more. Challenges of scalability and security in multi-cloud and hybrid-cloud environments are examined. Students will learn how various cybersecurity principles apply to cloud technology, such as Least Privilege, Defense in Depth, Attack Vector, Trust Boundaries, and Shared Responsibility Model, among others.

***Prerequisite*:** Cloud Computing Fundamentals

CS589 Special Topics (3 credit hours)

Special topics courses are offered to graduate students in the Computer Science program by current faculty members or invited guest speakers to expose the students to emerging technologies related to their studies. These courses are conducted the same way as regular courses.

Prerequisite: Depending on topic

CS595 Computer Science Capstone Course (3 credit hours)

Under the guidance of the course instructor, the capstone course is intended to integrate the knowledge and hands-on experience that the student has acquired from the foundation, core, and elective coursework required for the program in the course. The instructor determines the course objectives and scope based on the computer science curriculum and technology trend and guides the students to develop their integration ability. The student shall take the capstone course near the end of their program of study.

***Prerequisite*:** Must be in the final semester of the program.

Curricular Practicum

CPT501 Curricular Practicum (1 credit hour)

Curricular practicum, or curricular practical training, is a supervised practical experience that is the application of previously studied theory. The curricular practicum must provide students with valuable learning experience and must significantly increase their knowledge in their program of study. It is defined as alternative work/study, internship, cooperative education, or any other type

of required internship or practicum that is offered by sponsoring employers through cooperative agreements with the school, and the course is an integral part of an established curriculum. At least three hours of work in a practical setting has the credit equivalency of one hour of classroom lecture (1 credit hour). To be eligible to take this course, the student must be in good standing, have completed at least two semesters of coursework required in their degree program, and have obtained a written agreement that outlines the arrangement between the institution and the practicum site (including specific learning objectives, course requirements, and evaluation criteria), and received approval by a designated advisor. F-1 international students must follow additional rules required by the U.S. Immigration and Customs Enforcement. Information and instructions concerning this course are provided in the online application form.

This is a part-time practicum course taken by the graduate student to work no more than twenty hours each week during the approved practicum period. Failure in this course will prevent the student from taking any curricular practicum course afterward.

Prerequisite: Refer to the instructions on the application and agreement documents.

CPT502 Curricular Practicum (2 credit hours)

Curricular practicum, or curricular practical training, is a supervised practical experience that is the application of previously studied theory. The curricular practicum must provide students with valuable learning experience and must significantly increase their knowledge in their program of study. It is defined as alternative work/study, internship, cooperative education, or any other type of required internship or practicum that is offered by sponsoring employers through cooperative agreements with the school, and the course is an integral part of an established curriculum. At least three hours of work in a practical setting has the credit equivalency of one hour of classroom lecture (1 credit hour). To be eligible to take this course, the student must be in good standing, have completed at least two semesters of coursework required in their degree program, and have obtained a written agreement that outlines the arrangement between the institution and the practicum site (including specific learning objectives, course requirements, and evaluation criteria), and received approval by a designated advisor. F-1 international students must follow additional rules required by the U.S. Immigration and Customs Enforcement. Information and instructions concerning this course are provided in the online application form.

This is a full-time practicum course taken by the graduate student to work more than twenty hours but not to exceed forty hours each week during the approved practicum period. Failure in this course will prevent the student from taking any curricular practicum course afterward.

Prerequisite: Refer to the instructions on the application and agreement documents.

Data Science

DS500 Mathematics and Statistics for Data Science (3 credit hours)

This course is designed to provide students with a solid foundation in the fundamental mathematical and statistical concepts essential for success in the field of data science. It aims to equip students with the necessary quantitative skills to analyze and interpret data, make informed decisions, and derive meaningful insights from complex datasets.

Prerequisite: MATH208

DS501 Python Programming for Data Science (3 credit hours)

In this foundation course, students will embark on a journey to master the fundamental programming skills required for effective data analysis and manipulation using the Python programming language. Throughout the course, the instructor will engage students in hands-on coding exercises and projects to reinforce their learning. Students will be equipped with the skills necessary to tackle data science challenges and develop programs to perform data analysis using Python.

Prerequisite: **CS250**

DS512 Data Engineering (3 credit hours)

This course is designed to provide students with a comprehensive understanding of the key principles, techniques, and tools involved in data engineering. As organizations increasingly rely on data-driven decision-making, the role of data engineers has become critical in managing, processing, and transforming raw data into valuable insights. Students will explore various data storage solutions, data processing and integration, data warehousing, data security, and scalability/performance optimization.

DS520 Deep Learning (3 credit hours)

This course is designed to provide students with a solid understanding of the core concepts, techniques, and applications of deep learning (DL). Deep learning, a subset of machine learning, has revolutionized the field of artificial intelligence and has become an impetus behind advancements in various domains, including computer vision, natural language processing, and speech recognition. Students will learn the concepts of neural networks (CNNs & RNNs), the development of generative models, and applications of DL in artificial intelligence.

Prerequisite: CS500 or DS501

DS540 Natural Language Processing (NLP) (3 credit hours)

Natural language processing (NLP) is the subfield within data science involving supervised and unsupervised learning of textual data. This course presents the fundamental concepts, methods, and applications of NLP. It covers tokenization, syntactic and semantic analysis, named entity recognition, part-of-speech tagging, text classification, machine translation, sentiment analysis, and language models. It also covers different models and algorithms, such as n-grams, Hidden Markov Models, text classifiers, and recurrent neural networks. Practical assignments and projects

allow students to apply their knowledge to real-world applications and use cases such as sentiment analysis, chatbot development, and search engine relevance.

Prerequisite: DS500

DS565 Generative AI-Driven Intelligent Apps Development (3 credit hours)

In the fast-changing world of technology, the demand for intelligent applications powered by AI and ML is rapidly increasing. This course aims to provide students with the necessary expertise to develop cutting-edge applications and harness the potential of generative AI technology. Intelligent apps using generative AI technology stand apart from traditional apps by offering enhanced creativity, adaptive learning, personalized user experiences, automation, and decision-making capabilities, and human-like conversational abilities.

This course equips students with the skills to develop innovative apps that leverage the power of AI. Topics include an introduction to generative AI, deep learning, and machine learning techniques; implementing generative models for various domains; ethical considerations; and deploying AI-driven apps. Through hands-on projects and real-world case studies, students gain practical experience in designing and deploying generative AI models within a development framework. By the end of the course, students are prepared to contribute to the field of intelligent app development with a strong understanding of AI ethics.

Prerequisite: CS500 or DS501

DS589 Special Topics (3 credit hours)

Special topics courses are offered to graduate students in the Data Science program by current faculty members or invited guest speakers to expose the students to emerging technologies related to their studies. These courses are conducted the same way as regular courses.

Prerequisite: Depending on the topic

DS595 Data Science Capstone Course (3 credit hours)

Under the guidance of the course instructor, the capstone course is intended to integrate the knowledge and hands-on experience that the student has acquired from the foundation, core, and elective coursework required for the program in the course. The instructor determines the course objectives and scope based on the data science curriculum and technology trend and guides the students to develop their integration ability. The student shall take the capstone course near the end of their program of study.

***Prerequisite*:** Must be in the final semester of the program.

Electrical Engineering

EE461G Digital Design and HDL (3 credit hours)

This course develops the student's ability to design commonly used basic building blocks of modern digital systems and provides them with a fundamental knowledge of state-of-the-art design methodology, design considerations, and verification strategies for complicated digital hardware design. Topics include Verilog HDL basics, logic modeling, state machine design, and memory modeling using Verilog HDL. Additional topics on FPGA architecture, device vendors, FPGA design tools, FPGA applications, and the latest trends in the programmable logic industry are also covered. Students can use Verilog tools such as Synopsys VCS, Mentor Modelsim, Cadence NC Verilog, and Silo III Verilog Simulator from SimuCAD for their homework and design projects. Hands-on practice is required. Students are encouraged to take the HDL-based sequence of courses EE461 and EE512 to gain knowledge and experience in semicustom IC design using industry-grade EDA design tools.

Prerequisite/Corequisite: Logic Design/EE461LG

EE461LG Digital Design and HDL Lab (1 credit hour)

This is a drill course designed to be taken concurrently with the EE461G Digital Design and HDL course. The students gain hands-on experience with Verilog simulation tools to learn logic design. They will have the chance to work on several design projects. They will also learn the essentials of several popular scripting languages: Perl, Python, and Unix/Linux Shell.

Prerequisite/Corequisite: Logic Design/EE461G

EE468G Microelectronics Circuit Design and Analysis (3 credit hours)

This course provides an in-depth understanding of electronic circuit design and analysis at the transistor level. It is taken in preparation for studying more advanced analog or digital courses. The topics include differential and multistage amplifiers, current source and bias circuits, amplifier frequency response and feedback, output stages, operational amplifiers, inverters, combinational logic, and sequential logic. The lab is run in conjunction with the course material, and industry-standard CAD tools are applied.

Prerequisite: Circuit Theory

EE488G Computer Architecture (3 credit hours)

This course introduces the organization, design, and applications of modern computer architecture from both the hardware and software perspectives. Topics include performance benchmarks, instruction sets (for both RISC and CISC), computer arithmetic, memory, parallelism (instruction, data, and thread levels), I/O and storage, multicore processors and programming, and GPU (graphics processing unit). Hands-on labs involving HDL and SPIM simulations, assemblers, linkers, and multithread programming are required to enhance classroom learning.

Prerequisites: EE461 and CS250

EE504 Advanced Computer Architecture (3 credit hours)

This course is designed to further investigate modern computer design introduced in course EE488G. Topics include an in-depth study of multiprocessor architecture and interconnection networks, pipelines, data flow, algorithm structures, memory system design, cache memory design, and a comparison of the performance and design among various computer architectures. Hands-on project experience is required.

Prerequisite: EE461

EE505 Advanced Digital IC Design (3 credit hours)

This advanced course in digital circuit design applies the knowledge of advanced circuit design concepts to digital IC in state-of-the-art CMOS technologies. It emphasizes the design and optimization of circuits/layouts for combinational logic gates, sequential logic circuits, arithmetic building blocks, and memory circuits. The challenges of today's digital integrated circuit design, such as scaling, process variation, signal integrity, timing issues, interconnectivity, and power consumption, will be addressed specially. The circuit simulation tool (HSPICE), layout design tool (Virtuoso), and schematic entry tool (Composer) are used for homework assignments and projects.

Prerequisite: EE461

EE508 VLSI Design - Place and Route (3 credit hours)

This course is the third in the VLSI design series and introduces ASIC place and route. The course introduces the students to state-of-the-art physical design automation tools and techniques. Topics include design flow, library review, tool graphical interface, floor planning, power planning, timing-driven placement, static time analysis (STA), CT-Gen, special routing, final routing, engineering change order (ECO), and run batch mode jobs. Hands-on exercises and projects are required.

Prerequisite: EE461

EE509 Mobile and Wireless Communication (3 credit hours)

This course covers the concepts of frequency reuse, wireless communication channel characteristics, modulation and demodulation for wireless communications, equalization and channel coding, speech coding, multiple access techniques such as FDMA, TDMA, CDMA, FDD and TDD, and commercial wireless communication standards such as AMPS, GSM, IS136 (TDMA), and IS-95 (CDMA). Hands-on simulations are used to help students gain an in-depth understanding of wireless communication. Familiarity with communication theory and simulation tools such as MATLAB or System View is required.

Note: This is an introductory course on wireless technologies. Any topic, such as GSM, TDMA, or CDMA, can be expanded to a full-semester course under Special Topics offerings.)

Prerequisite: CE450

EE511 Advanced Analog IC Design (3 credit hours)

This course offers students extensive exposure to concepts and techniques in the analysis and design of analog IC, including device modeling, basic circuit building blocks, feedback system, frequency response, and noise. EDA tools may be used in homework assignments and projects.

Prerequisite: EE461

EE512 Application Specific Integrated Circuit Design (ASIC) (3 credit hours)

In connection with EE461, this course is designed for students who intend to become logic designers using HDL-based design methodologies. Topics include ASIC/CPLD/FPGA Library modeling, cell characterization, static timing analysis, place and route algorithms, design for testability, fault modeling, industry-standard formats for design information interchange, and a survey of the most popular EDA tools. Industry-grade design tools such as Synopsys Design Compiler, Cadence Verilog-XL, Synopsys DesignTime (under dc_shell), Synopsys Prime Time, Cadence Silicon Ensemble, Mentor Calibre LVS/DRC, and Synplicity Synplify are used for homework assignments and projects.

Prerequisite: EE461

EE517 Introduction to the Internet of Things (IoT) (3 credit hours)

The Internet of Things (IoT) promises to make “things,” including consumer electronic devices or home appliances, such as refrigerators, security cameras, and temperature sensors, part of the Internet environment. To realize the full potential of the IoT paradigm, this introductory course will address challenges and the various solutions available. The course content will cover IoT concepts and architecture, IoT enablers and solutions, IoT data and knowledge management, and IoT security and reliability. The students will need to complete a term project to demonstrate the concept of IoT for a chosen application based on an embedded system or a development platform.

Prerequisites: CS230 and CS250

EE520 Advanced FPGA Design and Implementations (3 credit hours)

Digital design using FPGAs is a particularly important activity in industries due to reduced costs, compared with ASIC design, and faster time-to-market. To design a digital system using FPGA, the designers must understand the architecture of the FPGA as well as the accompanying CAD tools. The course will cover two major Xilinx FPGA architectures in detail. The student will learn to build various digital blocks such as combinational logic, sequential logic, finite state machines, RAM, and DSP by studying the architectures of the FPGAs. Hands-on exercises are required.

Prerequisite: EE461

EE553 System on Chip (SoC) Design (3 credit hours)

System on Chip (SoC) is composed of many functional modules such as processor, memory, digital IPs, analog/mixed-signal modules, RF, and interfaces on a single chip. This course will focus on ARM-based on-chip bus platforms, digital IP verification, and the trend and integration of SoC.

Prerequisite: EE488

EE577 Design Verification with System Verilog (3 credit hours)

This course is designed to cover the design verification methodologies commonly used in system-on-chip (SoC) design. Topics include design verification basics, introduction of various verification strategies, verification of soft and hard IP blocks, verification for networking/communication ASIC, verification for audio/video signal processing ASIC, how to build an efficient and effective verification platform, automation of verification flow, test case coverage, how to create design models using PLI routine, formal verification, and more. The students will also be informed that design verification is becoming the bottleneck in modern ASIC design cycles, especially in system-on-chip (SoC) design. The verification cycle could consume 70% of the design cycle.

Prerequisite: EE461

EE589 Special Topics (3 credit hours)

Special topics courses are offered to graduate students in the Electrical Engineering program by current faculty members or invited guest speakers to expose the students to emerging technologies related to their studies. These courses are conducted the same way as regular courses.

Prerequisite: Depending on topic

EE595 Electrical Engineering Capstone Course (3 credit hours)

Under the guidance of the course instructor, the capstone course is intended to integrate the knowledge and hands-on experience that the student has acquired from the foundation, core, and elective coursework required for the program. The instructor determines the course objectives and scope based on the electrical engineering curriculum and technology trend and guides the students to develop their integration ability. The student shall take the capstone course near the end of their program of study.

***Prerequisite*:** Must be in the final semester of the program.

Professional Development

P450G Career Development (1 credit hour)

This course is designed for graduate students to take in preparation for becoming working professionals. Topics include effective communication strategies, emotional intelligence, diversity and cultural awareness, professional behavior, and interview skills.

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Business — Undergraduate Programs Course Numbering and Descriptions

For the undergraduate program, lower-division courses are numbered in the 100s and 200s, and upper-division courses are numbered in the 300s and 400s. For information on subjects numbered 500 and above, refer to the Business – Graduate Programs Course Numbering and Descriptions section.

Course No.	Description
100–199	Freshman-level courses
200–299	Sophomore-level courses
300–399	Junior-level courses
400–499	Senior-level courses
450–499	Senior-level specialized skills courses taken for undergraduate-level credit
450G–499G	Cross-listed specialized skills courses taken for graduate-level credits
500–599	Graduate-level courses

Courses are listed by subjects: Accounting, Artificial Intelligence, Business Analytics, Business Law, Curricular Practicum, Economics, Finance, General Business, Management, Marketing, and Career Development. Each course description is followed by any prerequisite or corequisite information.

Each **1-credit-hour lab course** requires at least 2 contact hours of lab work each week. Each **1 credit hour of a practicum course** requires at least 45 contact hours of practical experience related to the student's program curriculum.

Accounting (3 credit hours required)

ACC110 Financial Accounting (3 credit hours; required)

This is the study of accounting as an information system, examining why it is important and how it is used by investors, creditors, and others to make decisions. The course covers the accounting information system, including recording and reporting of business transactions with a focus on the accounting cycle, the application of Generally Accepted Accounting Principles (GAAP), financial statements, and statement analysis. It includes issues relating to assets, liability, and equity valuation; revenue and expense recognition; cash flow; internal controls; and ethics.

ACC120 Managerial Accounting (3 credit hours)

This course studies how managers use accounting information in decision-making, planning, directing operations, and controlling. It focuses on cost terms and concepts, cost behavior, cost structure, and cost-volume-profit analysis. Issues relating to cost systems, cost control, profit planning, and performance analysis in manufacturing and service environments are included.

ACC450 Cost Accounting (3 credit hours)

This class applies the essentials of financial accounting to the practice of management. Students will understand cost definitions, cost concepts, cost behavior, and cost estimation. In addition, they will learn how cost accounting is applied to manufacturing and service organizations, the principles of planning and control for effective cost-related management, capital budgeting, and cash flow statements, and how to analyze financial statements.

Prerequisite/Corequisite: ACC110 or ACC120 or equivalent, or upper-division/graduate-level status

ACC451 Intermediate Accounting - I (3 credit hours)

Designed for students who are interested in pursuing careers as accounting professionals, this course enhances the student's understanding of the principles of accounting. Topics include understanding financial accounting and accounting standards, financial statement preparation, required disclosures, and in-depth study of current assets, revenue recognition, and fixed assets.

Prerequisite/Corequisite: ACC120 or ACC450 or equivalent

ACC452 Intermediate Accounting - II (3 credit hours)

This course is a continuation of Intermediate Accounting – I (ACC451). Subject matter includes current and long-term liabilities, stockholders' equity, investments, pension and postretirement benefits, leases, and cash flow statements.

Prerequisite/Corequisite: ACC451 or equivalent

ACC490 Introduction to Taxation (3 credit hours)

This course covers taxation concepts applied to an individual's income, deductions, credits, property transactions, and tax accounting methods. An understanding of the concepts will enable students to prepare quality individual income tax returns as a professional. The course will also cover taxation rules governing financial planning.

Prerequisite/Corequisite: Upper-division/graduate-level status

Artificial Intelligence (12 credit hours required for AI concentration)

Business Analytics (3 credit hours required; 12 credit hours required for BAN concentration)

Note: BAN5xx courses may also be used to meet BAN's 12 credit-hour concentration requirement.

BAN223 SQL and Relational Databases (3 credit hours)

The course emphasizes using SQL/RDMSs as a tool in support of business and data analytics. After completing this course, students will be able to explain the theory and best practices supporting relational database management systems (RDMSs) and be able to use SQL's (Structured Query Language) friendly approach for entering, retrieving, updating, and sorting data, calculating statistics, and modifying the structure of the internal data storage tables. Time permitting, using a programming language to establish remote connections will also be covered.

BAN452 Excel for Finance, Accounting & Analytics (3 credit hours)

Excel is a widely used tool, and its skillful use provides multiple benefits over one's professional career. Students will learn to master many areas of Excel's flexibility, including graphics, conditional formatting, sorting, pivot tables, conditional calculations, data loading, and the use of Excel's powerful functions and Analysis Tool Pak/Solver extensions. Time permitting, business modeling will be introduced.

BAN460 Introduction to Business Analytics (3 credit hours) - Required

This course teaches the basics of business analytics. The students learn to use popular data analysis tools to analyze business data for the purpose of understanding business trends, making business forecasts, and improving an organization's decision-making and business strategies.

Recommendation: A working knowledge of Excel and statistics

BAN463 Data Visualization (3 credit hours)

Students will learn how to explore data and provide insight to others using data visualization techniques. After completing this course, students will be able to design, develop, analyze, and interpret various types of visualizations. They will also be able to develop compelling presentations and insightful stories based on a given case study. The approach used will include theory as well as a hands-on component.

BAN470 Intro to Machine Learning-Based Forecasting (3 credit hours)

This course provides a comprehensive and hands-on application of machine learning (ML) to real-world business prediction, forecasting, and decision-making. The course is Python-based and covers both traditional forecasting methods (e.g., AR, ARIMA) and the more modern AI-based methods. Students will learn how to compare and contrast the benefits of various models/algorithms and select the best models for the task at hand, prepare and import data, address data anomalies, train their models, modify and optimize their models, perform final model evaluation, and make recommendations based on their model's predictions to decision makers. This course is open to computer science students.

BAN472 Introduction to Artificial Intelligence (AI) (3 credit hours)

This course provides a comprehensive introduction to artificial intelligence (AI), covering its history, fundamental concepts, applications, risks, and mitigation strategies. It offers insights into AI components and technologies, development processes, and ethical considerations, preparing students to understand the evolving world of AI.

Note: This course is not open to students enrolled in the School of Engineering without prior written approval from the Engineering Department Chair. Engineering students are encouraged to take CS483/CS483L Fundamentals of Artificial Intelligence.

Business Law (3 credit hours required)

BLAW310 Introduction to Business Law (3 credit hours; required)

This course is designed as an introductory-level course in U.S. business law. The focus will be on preparing students to spot potential legal issues in the operation of businesses so they can operate legally and know when to consult an attorney before taking action. The course begins with an overview of the fundamental structures and processes of the U.S. legal system. Topics include sources of law and ethics, contracts, torts, agency, criminal law, business organizations, and judicial and administrative processes. Emphasis is placed on fundamental legal principles pertaining to business transactions.

Business (3 credit hours required)

BUS387 Independent Research Project (variable 1-3 credit hours)

This course offers students a unique opportunity to engage in one-on-one mentorship with a faculty mentor to conduct in-depth research on a topic of their choice within the field of business. This course fosters independent research skills, critical thinking, and academic writing proficiency. The culmination of the course is a publication-quality research paper suitable for submission to a peer-reviewed academic journal.

BUS450 Professional and Technical Writing (3 credit hours; required)

This course presents students with practical instructions about communicating in different kinds of academic and workplace environments, as well as professional/technical communities. Students will learn how to organize and produce common professional writing work, such as technical reports, white papers, proposals, theses, and resumes. The course also covers different forms of effective writing, writing styles, approaches, formats, and citations of referenced materials.

BUS493 Senior Project (3 credit hours)

This instructor-driven course implements a senior project as a culminating undergraduate experience in a student's professional area of interest, wherein students successfully demonstrate mastery of specialized knowledge and effectively communicate their results in writing and in oral presentations. Projects may later be used to showcase a student's skills to potential industry employers or as material to support graduate-level studies.

Prerequisite: Open to School of Business undergraduate students who have earned 90 semester credit hours before starting their senior project.

Curricular Practicum

CPT401 Curricular Practicum (1 credit hour)

Curricular practicum, or curricular practical training, is a supervised practical experience that applies previously studied theory. The curricular practicum must provide students with valuable learning experience and must significantly increase their knowledge in their program of study. It is defined as an integral part of an established curriculum and an alternative work/study, internship, cooperative education, or any other type of required internship or practicum that is offered by sponsoring employers through cooperative agreements with the school. At least 3 hours of work in

a practical setting have the credit equivalency of 1 hour of classroom lecture (1 credit hour). To be eligible to take this course, the student must be in good standing, have completed at least two semesters of coursework required in their degree program, and have obtained a written agreement that outlines the arrangement between the institution and the practicum site (including specific learning objectives, course requirements, and evaluation criteria), and received approval from a designated advisor. F-1 international students must follow additional rules required by the U.S. Immigration and Customs Enforcement. Students must use SFBU's online tool to submit their application to take this course before meeting with a designated advisor to assess eligibility. Information and instructions concerning this course are provided in the application form. This is a part-time practicum course taken by the undergraduate student to work no more than 20 hours each week during the approved practicum period. Failure on this course will prevent the student from taking any other curricular practicum course.

Prerequisite: Refer to the instructions in the application and agreement documents.

CPT402 Curricular Practicum (2 credit hours)

Curricular practicum, or curricular practical training, is a supervised practical experience that applies previously studied theory. The curricular practicum must provide students with valuable learning experience and must significantly increase their knowledge in their program of study. It is defined as an integral part of an established curriculum and an alternative work/study, internship, cooperative education, or any other type of required internship or practicum that is offered by sponsoring employers through cooperative agreements with the school. At least 3 hours of work in a practical setting have the credit equivalency of 1 hour of classroom lecture (1 credit hour). To be eligible to take this course, the student must be in good standing, have completed at least two semesters of coursework required in their degree program, obtain a written agreement that outlines the arrangement between the institution and the practicum site (including specific learning objectives, course requirements, and evaluation criteria), and receive approval from a designated advisor. F-1 international students must follow additional rules required by the U.S. Immigration and Customs Enforcement. Students must use SFBU's online tool to submit their application for this course before meeting with a designated advisor to assess eligibility. Information and instructions concerning this course are provided in the application form. This is a full-time practicum course that requires the undergraduate student to work more than 20 hours but does not exceed 40 hours each week during the approved practicum period. Failure on this course will prevent the student from taking any other curricular practicum course.

Prerequisite: Refer to the instructions in the application and agreement documents.

Economics (6 credit hours required)

ECON201 Principles of Macroeconomics (3 credit hours; required)

This introductory course focuses on aggregate economic analysis. Topics include aggregate measures of economic activity, macroeconomic equilibrium, money and financial institutions, monetary and fiscal policy, international economics, and economic growth.

(Lower Division GE – Social Sciences area for nonbusiness majors)

ECON202 Principles of Microeconomics (3 credit hours; required)

This is an introductory course focusing on the choices of individual economic decision-makers. Topics include scarcity, specialization and trade, market equilibrium, elasticity, production and cost theory, market structures, factor markets, and market failure.

(Lower Division GE – Social Sciences area for nonbusiness majors)

ECON588 Managerial Economics (3 credit hours)

This course provides a rigorous and integrative study of topics in microeconomics and macroeconomics, with a strong emphasis on business applications. Students will explore core areas of economic theory, including consumption-based models, market efficiency, behavioral economics, individual and firm decisions, cost curves, market structures, and extend to game theory applications. The course also investigates macro-financial linkages, monetary policy impacts on financial markets, and financial crises through an economic lens, open and closed economies, and an introduction to economic history. In parallel, students will develop advanced econometric skills essential for analyzing financial and economic data.

Finance (3 credit hours required)

FIN310 Fundamentals of Finance (3 credit hours; required)

This course introduces students to the world of finance. Financial management is concerned with the efforts of the corporation's managers to raise and allocate capital in a manner that will maximize and stabilize the firm's future cash flow. This course examines the concepts and techniques available to financial managers as they address various aspects of financing and investment questions. Topics include financial background, a review of accounting, financial statements, and taxes, cash flow and financial analysis, the financial system and interest, time value of money, the valuation and characteristics of bonds, the valuation and characteristics of stocks, risk and return, capital budgeting, and international finance. A case study will be applied to assist students' learning.

Management

MGT310 Principles of Management (3 credit hours; required)

This course is designed for students to learn the basic skills, applications, and foundations of management. Specifically, students will learn organizational structure and environment, as well as develop skills in planning, organizing, leadership, motivation, decision-making, communication, negotiation, and managing information for decision-making. This course serves as a foundation for a more in-depth study of various aspects of management covered in other courses.

Preparation Recommendation: ECON201, ECON202

MGT450 Organizational Behavior and Management (3 credit hours)

This course explores the complex dimensions of organizational behavior, including examining experiential and conceptual approaches to communication, self-awareness, perception, motivation, problem-solving, and culture. Students apply interpersonal and intrapersonal exploration to manage change, leadership theories, and organizational issues.

MGT451 Project Management (3 credit hours; required)

This course introduces the principles of project and program management, the roles of project management, matrix organization in both private and public segments, and project management techniques leading to the efficient execution and completion of projects.

Proposal development, case studies, and independent projects are required.

MGT460 Production and Operations Management (3 credit hours)

This course balances the theory and practice of production and operations management, covering quantitative, qualitative, and behavioral aspects. Students will learn how to identify and apply strategies, business process design principles, and quantitative techniques. This knowledge will then be applied to optimize business operations, enhance efficiency, and improve competitiveness. Students will develop quantitative models and use software tools such as Microsoft Excel Analysis Tool Pak and Solver to create solutions for multivariate operational constraints. Typical control cases include service and product design choices, sales forecasting, scheduling, metrics for production/inventory control, statistical quality control, and logistical constraints.

MGT480 Entrepreneurship (3 credit hours; required)

This course explores the full range of entrepreneurial processes, including the evaluation, development, and creation of a successful business. It will help potential entrepreneurs and professionals visualize and experience entrepreneurial development. The course explores the entrepreneurial approach to resources, such as developing an organizational structure, market analysis, financing entrepreneurial ventures, and screening venture opportunities. Individuals will experiment and evaluate what it takes to be an entrepreneur, including developing a plan for a new business.

MGT482 Launching Innovative Startups (3 credit hours)

From introduction to mastery, this hands-on project-based course is ideal for entrepreneurs, future entrepreneurs, business owners, and innovators alike. To put your dream into action, the logical entrepreneur development process will be covered from the ideation and business modeling phases through the funding and marketing launch phases. Discussions are flexible, with student-suggested topics welcome, such as design thinking, lean startup, validating the market opportunity, tips for successful startup team management, low-cost marketing tactics, pricing strategy, etc.

MGT483 Business Innovation – A Historical and Cultural Perspective (3 credit hours)

This course explores the evolution of business innovation through the lens of history, culture, and global influence. Students will examine how groundbreaking ideas, products, and business models have emerged across different eras—from the Industrial Revolution to the digital age—and how

cultural contexts have shaped their development and adoption. Through case studies spanning diverse regions and industries, the course analyzes the social, economic, and technological forces that drive innovation, as well as the leadership strategies that enable its success. Topics include the role of entrepreneurship in economic transformation, cross-cultural approaches to problem-solving, and the interplay between tradition and disruption. By connecting past innovations to contemporary business challenges, students will gain the historical insight and cultural awareness needed to envision and lead future change.

MGT491 Agility-Based Leadership (3 credit hours)

Using Business Agility Institute's (BAI) best practices to cultivate adaptive and resilient organizations through cultural engagement, agile principles, and operational efficiency. Through real-world case studies and interactive projects, students will judge strategies for fostering a dynamic and engaged workforce for delivering value. We will explain the performance driven business models and designing optimized operations for driving continuous improvement to meet evolving market demands. By the end of this course, students will be equipped with the skills and knowledge necessary to design organizational framework for cultural transformation, operational flexibility, and workforce engagement.

Marketing (3 credit hours required)

MKT221 HTML & CSS Web Page Construction (3 credit hours; required)

Students completing this course will gain a deep and technically accurate understanding of how websites work, display and gather data, and become proficient using HTML & CSS to create, modify, and maintain user-facing (client side) web pages. Hypertext Markup Language (HTML) is the web page's working language surrounding content. Cascading Style Sheets (CSS) provide a consistent look and feel styling across the website. Time permitting, the instructor may also introduce other technologies, such as JavaScript and SQL, and explain how they bring advanced functionality to a website.

MKT310 Principles of Marketing (3 credit hours; required)

This course introduces the major marketing principles, marketing's role within the company, and its role in the global economy. Studies will focus on how to find marketing opportunities with market segmentation, how to get information for marketing decisions, the elements of product planning and new product development, wholesalers and retailers and their strategies, pricing, and promotion.

MKT450 Marketing Management (3 credit hours)

This course studies marketing management by analyzing real-world cases. Students will learn to implement and execute the marketing process through situation assessment, strategy formulation, marketing planning, and marketing implementation and evaluation.

Prerequisite/Corequisite: MKT310 or upper-division/graduate-level status

MKT483 Monetizing Intellectual Property (3 credit hours)

Intellectual property (IP) is a firm's most valuable asset. Ideal for social media content creators and going beyond traditional IP definition and usage, students in this course will learn innovative models and interesting strategies for generating capital and value from intangible assets. The rapidly growing U.S. market for leasing intellectual property is already greater than $63 billion per year. Course topics include Outright Sales, Third-Party Licensing, Royalty Securitizations, Bowie Bonds, Collateralization, Donations, Copyrights, Trademarks, Trade Secrets and Patents, etc. This course contains assignments with research and role-playing.

MKT491 The Art of Negotiation (3 credit hours)

This course will enable students to acquire comprehensive knowledge and develop advanced skills to navigate complex negotiation scenarios and influence various stakeholders, including customers, vendors, managers, peers, and direct reports. Throughout the course, students will analyze and apply theories and practical strategies to achieve mutually beneficial outcomes, commonly known as win-win solutions. The curriculum emphasizes the importance of a strategic mindset, disciplined preparation, and the development of key interpersonal skills that are crucial for achieving desired objectives in negotiations. Students will engage in real-world and practical applications through case studies and simulations relevant to Silicon Valley. They will analyze various negotiation contexts, including entertainment and sports, and participate in projects focused on negotiating to maximize profitability. By integrating real-world examples with theoretical concepts, this course prepares students to apply negotiation skills effectively in diverse business environments.

Professional Development

P450 Career Development (1 credit hour; required)

This course is designed for students to take in preparation for becoming working professionals. Topics include effective communication strategies, emotional intelligence, diversity and cultural awareness, professional behavior, and interview skills.

Note: SOC501 Emotional Intelligence Essentials may be used as a substitute for P450.

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Business – Graduate Programs Course Numbering and Descriptions

Master's degree courses are numbered in the 500s. Each master's degree program allows for a limited number of credits for 400-level courses with a "G" suffix.

Course No.	*Description*
450G–499G	Cross-listed specialized skills courses taken for graduate-level credits
500–599	Graduate-level courses

For information on prerequisites, corequisites, or subjects numbered below 450, refer to the section Business — Undergraduate Programs Course Numbering and Descriptions above.

Courses are listed by subject: Accounting, Artificial Intelligence, Business Analytics, Business Law, Business, Curriculum Practicum, Finance, Green Business Management, Management, Marketing, Professional Development, and Social Science. Each course description is followed by any prerequisite or corequisite information or recommendations.

Each **1-credit-hour lab** course requires at least 2 contact hours of lab work each week. Each **1-credit hour of a practicum course** requires at least 45 contact hours of practical experience related to the student's program curriculum.

Accounting

ACC450G Cost Accounting (3 credit hours)

This class applies the essentials of financial accounting to the practice of management. Students will understand cost definitions, cost concepts, cost behavior, and cost estimation. In addition, they will learn how cost accounting is applied to manufacturing and service organizations, the principles of planning and control for effective cost-related management, capital budgeting, and cash flow statements, and how to analyze financial statements.

Prerequisite/Corequisite: ACC110, or ACC120, or upper-division/graduate-level status

ACC451G Intermediate Accounting – I (3 credit hours)

Designed for students who are interested in pursuing careers as accounting professionals, this course enhances the student's understanding of the principles of accounting. Topics include understanding financial accounting and accounting standards, financial statement preparation, required disclosures, and in-depth study of current assets, revenue recognition, and fixed assets.

Prerequisite/Corequisite: ACC120, or ACC450, or equivalent

ACC451LG Intermediate Accounting – I Lab (1 credit hour)

This lab course is designed to be taken concurrently with the ACC451G Intermediate Accounting course. However, it is a separate course with its own syllabus and topics. On completing this practical lab, students will be able to manage complex accounting situations using real-world examples from the accounting topics covered in ACC451G. During class meetings, students will interact with specific issues such as multiyear accrual recognition of delayed revenues and in-depth study of current assets and determine how to address them both theoretically and in the finer details of recording. Students may have to modify their accounting software configuration to reflect the given issue according to their accounting needs properly.

Prerequisite/Corequisite: ACC120L, ACC450, or ACC451, or equivalent

ACC452G Intermediate Accounting – II (3 credit hours)

This course continues Intermediate Accounting – I (ACC451G). Subject matter includes current and long-term liabilities, stockholders' equity, investments, pension and postretirement benefits, leases, and cash flow statements.

Prerequisite/Corequisite: ACC451 or equivalent

ACC490G Introduction to Taxation (3 credit hours)

This course covers taxation concepts applied to an individual's income, deductions, credits, property transactions, and tax accounting methods. An understanding of the concepts will enable students to prepare quality individual income tax returns as a professional. The course will also cover taxation rules governing financial planning.

Prerequisite/Corequisite: Upper-division/graduate-level status

ACC501 Advanced Accounting (3 credit hours)

This course is designed for accounting graduate students who want to have a complete understanding of the concept of consolidation requirements, consolidated financial statements, and accounting techniques relating to particular types of business and non-business entities. The student will also explore various tax aspects of consolidated financial statements and participate in case studies.

Prerequisite/Corequisite: ACC451, or ACC452, or equivalent

ACC512 Federal Taxation of Business Enterprises (3 credit hours)

This course is designed to give students an understanding of the concepts of federal taxation of corporations, partnerships, estates, and trusts. An understanding of the concepts will enable students to prepare corporation and partnership tax returns in a professional environment. Also covered are rules governing trusts and estates.

Prerequisite/Corequisite: Upper-division/graduate-level status

ACC530 Auditing (3 credit hours)

In this course, students learn auditing techniques, procedures, practices, and programs based on Generally Accepted Accounting Principles (GAAP) in the United States; students will learn best practices for working document preparation and report writing.

> ***Prerequisite/Corequisite:*** ACC451, or ACC452, or ACC501, or upper-division/graduate-level status with the permission of the instructor

Artificial Intelligence

AI450 AI in Modern-Day Society: A Survey

This course explores the intersection of Artificial Intelligence (AI) and emerging technologies, including Web 3.0, the Metaverse, Blockchain, Cybersecurity, Quantum, Biotechnology, IoT, Edge Computing, Space technologies and Environmental, Social, and Governance (ESG) frameworks. It will also cover Physical AI and Agentic AI, as well as other emerging technologies. Students will analyze the transformational potential of these technologies and the ethical, security, and sustainability challenges they pose. By investigating real-world applications and industry case studies, students will understand how these innovations are reshaping businesses, communities, and global economies. This interdisciplinary course emphasizes practical skills, critical thinking, and collaboration to prepare students for leadership in a tech-driven future.

AI501 Management and Leadership in AI

This course delves into the dynamic intersection of leadership and artificial intelligence (AI), equipping future leaders with the skills to thrive in an AI-driven world. Students will master the art of leading teams—composed of AI agents and people—while driving impactful organizational transformation. Combining real-world case studies, interactive simulations, and practical applications, this course offers a balanced mix of theoretical frameworks and hands-on applications, rooted in organizational leadership, HR strategy, and AI-powered innovation. Leaders will build the strategic mindset necessary to address the AI era's unique ethical and cultural challenges while learning to cultivate organizational cultures where human talent and AI capabilities work in harmony. The curriculum incorporates global perspectives on AI ethics, governance, and cross-industry applications, empowering students to make informed decisions that fuel innovation, foster collaboration, and deliver sustainable results. By the end of this course, students will emerge with a future-ready leadership mindset and understand practical tools to excel in an AI-augmented business landscape.

AI505 Corporate Strategy in AI

Artificial Intelligence (AI) is no longer a siloed technical capability—it is a board-level imperative shaping competitive advantage across every industry. This graduate-level course equips current and aspiring business leaders with the strategic frameworks, governance principles, and organizational change levers needed to integrate AI at enterprise scale. Students will learn to diagnose value pools where AI creates defensible advantage in products, processes, and customer experience. We will also formulate portfolio, platform, and partnership strategies that align AI investments with corporate goals, then assess ethical, legal, and societal risks, designing guardrails for responsible AI. Students will learn how to mobilize cross-functional talent, data, and technology

infrastructures to accelerate adoption, as well as measure AI performance using financial and non-financial KPIs tied to strategic intent. Through case studies, simulations, and a capstone consulting project, participants develop an end-to-end AI strategy for a real or hypothetical organization, ready for C-suite review.

AI510 Data Science and AI

This course provides a comprehensive foundation in data science and artificial intelligence, covering core concepts such as data preprocessing, statistical analysis, machine learning, and AI model development. Students will learn how to collect, clean, and analyze data using modern tools such as Python, R, and cloud-based platforms. Emphasis is placed on supervised and unsupervised learning, deep learning, and ethical considerations in AI. Through practical projects and case studies, students will gain hands-on experience applying data science and AI techniques to solve real-world problems across domains like healthcare, finance, and business operations.

AI515 Leveraging AI and Emerging Technologies for Startups

This course explores how startups can harness the power of artificial intelligence and emerging technologies to build innovative, scalable, and competitive business models. Topics include AI-driven product development, cloud infrastructure, blockchain, IoT, and automation strategies. Students will examine case studies of successful tech startups and learn how to identify and evaluate market opportunities using AI. The course emphasizes agile methodologies, lean startup principles, and the ethical and regulatory landscape surrounding emerging technologies. A final project challenges students to pitch a tech-enabled startup idea with a clear AI value proposition.

Business Analytics

BAN452 Excel for Finance, Accounting & Analytics (3 credit hours)

Excel is a widely used tool, and its skillful use provides multiple benefits over one's professional career. Students will learn to master many areas of Excel's flexibility, including graphics, conditional formatting, sorting, pivot tables, conditional calculations, data loading, and using Excel's powerful functions and Analysis Tool Pak/Solver extensions. Time permitting, business modeling will be introduced.

Recommendation: A working knowledge of statistics.

BAN455G Server-Side Data Processing Using Python/PHP (3 credit hours)

After completing this course, students will be able to implement industrial-scale business algorithms and process complex data sets and business models with active code for powerful backend analytics and relational database engines. Students will learn how to add smart logic and information-passing connections using server-side languages/scripts such as Python or PHP. Students are expected to have access to a computer or cloud account on which they will install a web server, database, and Python or PHP for the programming language as determined by the instructor.

Recommendation: A working knowledge of HTML and a procedural programming language

BAN460G Introduction to Business Analytics (3 credit hours)

This course teaches the basics of business analytics. The students learn to use popular data analysis tools within Microsoft Excel to analyze business data for the purpose of understanding business trends, making business forecasts, and improving an organization's decision-making and business strategies. The course includes the basics of probability theory, hypothesis testing, and predictive modeling. Recommendation: A working knowledge of Excel and statistics

BAN463G Data Visualization (3 credit hours)

Students will learn how to explore data and provide insight to others using data visualization techniques. After completing this course, students will be able to design, develop, analyze, and interpret several types of visualizations. They will also be able to develop compelling presentations and insightful stories based on a given case study. The approach used will include theory as well as a hands-on component.

BAN470G Intro to Machine Learning-Based Forecasting (3 credit hours)

This course provides a comprehensive and hands-on application of machine learning (ML) to real-world business prediction, forecasting, and decision-making. The course is Python-based and covers both traditional forecasting methods (e.g., AR, ARIMA) and the more modern AI-based methods. Students will learn how to compare and contrast the benefits of various models/algorithms and select the best models for the task at hand, prepare and import data, address data anomalies, train their models, modify and optimize their models, perform final model evaluation, and make recommendations based on their model's predictions to decision makers. This course is open to computer science students.

BAN472 Introduction to Artificial Intelligence (AI) (3 credit hours)

This course provides a comprehensive introduction to artificial intelligence (AI), covering its history, fundamental concepts, applications, risks, and mitigation strategies. It offers insights into AI components and technologies, development processes, and ethical considerations, preparing students to understand the evolving world of AI. ***Note:*** **This course is not open to students enrolled in the School of Engineering**… they are encouraged to take CS483/CS483L Fundamentals of Artificial Intelligence.

BAN501 Quantitative Methods for Business (3 credit hours; required for MSBAn)

This course is designed to introduce students to contemporary business decision-making methodologies and develop the student's ability to analyze complex systems. It focuses on quantitative methods of management science and operations research using quantitative analysis. The students learn to evaluate models from real-world examples and techniques to analyze and solve problems. Students also learn to use quantitative analysis software, critically evaluate the results, and perform sensitivity analysis. Students will learn how to perform Monte Carlo simulations, stochastic forecasting and predictive modeling, portfolio optimization, dynamic project management with risk-based simulation of cost and schedule, VBA coding, Microsoft Excel-based forms with automation and pivots, Microsoft Access database, SPSS, Minitab, EViews, R, R-Studio, Risk Simulator, PEAT software applications.

BAN520 Business Analytics for Dashboards (3 credit hours)

This course will teach you how to display data analysis results on dashboards. It covers how to design and build dashboards, as well as the data visualizations to be displayed in them using a leading analytics tool. You will learn how to present data, using charts and other types of visualizations, in the most effective way by following the best practices for data visualization and dashboards. The assignments and projects will enable you to design, develop, and modify visualizations and dashboards. Out-of-class activities include reading assignments, case study analysis, and the project.

Prerequisite/Corequisite: Upper-division/graduate-level status

BAN524 Intermediate Business Analytics (3 credit hours)

This course is designed to teach business analytics as applied by enterprises to make business strategies and decisions for improving business performance. The students will learn the foundations of business analytics, tools and methods of data analysis, and major models and application techniques used for making business decisions. The course will also introduce analytics trends by discussing the emerging role of big data and big analytics. Hands-on exercises are required.

BAN572 Process Management for Analytics (3 credit hours)

Students will learn how to design and implement a self-service analytics (SSA) business process pipeline to increase productivity and become self-sufficient for their reporting and analytics needs. They will gain the ability to make optimal trade-offs among various computer technologies using a ranking and selection methodology. Students will be able to apply their SSA pipeline to solve business challenges at the enterprise level.

BAN589 Special Topics: Quantitative Risk Management (CQRM) (3 credit hours)

This course provides the student with a comprehensive understanding of the principles and practices of applying data and decision analytics under risk and uncertainty to obtain actionable intelligence for optimal business decisions. We will explore key analytical and risk-based concepts such as Monte Carlo risk simulations, financial forecasting, predictive analytics, decision analytics, strategic real options, and capital portfolio allocation. We will use cloud-based computing, or students can bring personal laptops and install the requisite software applications. By the end of this course, you will be equipped with the skills and knowledge necessary to analyze economic, financial, and analytical data and results, develop decision strategies, and make sound, analytically based decisions. Completing this course allows students to register for and take the CQRM (Certified in Quantitative Risk Management) exam. *

**Note: This course follows the curriculum the International Institute of Professional Education and Research (IIPER) prescribes. It qualifies the student to take the CQRM (Certified in Quantitative Risk Management) certification exam. The course material follows the ISO31000 (International Standards Organization, standard number 31000), Institute of Risk Management in the United Kingdom (IRM-UK), and Basel IV Accords (Bank of International Settlements). Upon completion of the course, students are also eligible to receive 30 professional development units (PDU) applicable from the Project Management Institute; 30 continuing professional development (CPD) credits from the Energy Institute as well as from IChemE and the Institute of Risk Management; 39 continuing education (CE) credits from the CFA Institute; and 39 continuing*

professional education (CPE) units from the AICPA (American Association of Chartered Public Accountants) and NASBA (National Association of the State Boards of Accountancy). Credits will be assigned after students register for and attempt the CQRM certification exam. These are NOT academic credits at SFBU. These are professional continuing credits provided by various professional institutions. Additional information will be provided in the class.

Business

BUS450G Professional and Technical Writing (3 credit hours)

This course presents students with practical instructions about communicating in various kinds of academic and workplace environments, as well as professional/technical communities. Students will learn how to organize and produce common professional writing work, such as technical reports, white papers, proposals, theses, and resumes. The course also covers different forms of effective writing, writing styles, approaches, formats, and citations of referenced materials.

BUS587 Independent Research Project (variable 1-3 credit hours)

This graduate course offers students a unique opportunity to engage in one-on-one mentorship with a faculty mentor to conduct in-depth graduate-level research on a topic of their choice within the field of business. This course fosters independent research skills, critical thinking, and academic writing proficiency. The culmination of the course is a publication-quality research paper suitable for submission to a peer-reviewed academic journal.

BUS589 Special Topics (3 credit hours)

Special topics courses are offered by current faculty members or invited guest speakers to expose the students to emerging business topics. These courses are conducted in the same way as regular courses.

Prerequisite/Corequisite: Topic dependent

BUS595 Business Capstone Course (3 credit hours; required for both MBA and MSBAn)

The capstone course is intended to integrate the knowledge and hands-on experience that the student has acquired from the foundation, core, and elective coursework required for the program under the guidance of the course instructor. The instructor determines the course objectives and scope based on the business curriculum and trends and guides the students to develop their integration ability. The student shall take the capstone course near the end of their program of study.

***Prerequisite/Corequisite*:** 24 credit hours or more completed in the related graduate business program

Curricular Practicum

CPT501 Curricular Practicum (1 credit hour)

Curricular practicum, or curricular practical training, is a supervised practical experience that applies previously studied theory. The curricular practicum must provide students with valuable learning experience and must significantly increase their knowledge in their program of study. An integral part of an established curriculum is defined as an alternative work/study, internship, cooperative education, or any other type of required internship or practicum that is offered by sponsoring employers through cooperative agreements with the school. At least 3 hours of work in a practical setting have the credit equivalency of 1 hour of classroom lecture (1 credit hour). To be eligible to take this course, the student must be in good standing, have completed at least two semesters of coursework required in their degree program, and have obtained a written agreement that outlines the arrangement between the institution and the practicum site (including specific learning objectives, course requirements, and evaluation criteria), and received approval from a designated advisor. F-1 international students must follow additional rules required by the U.S. Immigration and Customs Enforcement. Students must use SFBU's online tool to submit their application for this course before meeting with a designated advisor to assess eligibility. Information and instructions concerning this course are provided in the online application form. This is a part-time practicum course that requires the graduate student to work no more than 20 hours each week during the approved practicum period. Failure on this course will prevent the student from taking any other curricular practicum course.

Prerequisite: Refer to the instructions in the application and agreement documents.

CPT502 Curricular Practicum (2 credit hours)

Curricular practicum, or curricular practical training, is a supervised practical experience that applies previously studied theory. The curricular practicum must provide students with valuable learning experience and must significantly increase their knowledge in their program of study. An integral part of an established curriculum is defined as an alternative work/study, internship, cooperative education, or any other type of required internship or practicum that is offered by sponsoring employers through cooperative agreements with the school. At least 3 hours of work in a practical setting have the credit equivalency of 1 hour of classroom lecture (1 credit hour). To be eligible to take this course, the student must be in good standing, have completed at least two semesters of coursework required in their degree program, and have obtained a written agreement that outlines the arrangement between the institution and the practicum site (including specific learning objectives, course requirements, and evaluation criteria), and received approval from a designated advisor. F-1 international students must follow additional rules required by the U.S. Immigration and Customs Enforcement. Students must use SFBU's online tool to submit their application to take this course before meeting with a designated advisor to assess eligibility. Information and instructions concerning this course are provided in the online application form. This is a full-time practicum course that requires the graduate student to work more than 20 hours but does not exceed 40 hours each week during the approved practicum period. Failure on this course will prevent the student from taking any other curricular practicum course.

Prerequisite: Refer to the instructions on the application and agreement documents.

Economics

ECON470G The Economics of Money, Banking, and Financial Markets (3 credit hours)

This course brings a fresh perspective to today's major questions surrounding financial and monetary policies. Topics include the behavior of interest rates, monetary strategy and tactics, the demand for money, and an introduction to the work of Frederic Mishkin, former Governor of the Federal Reserve (predecessor to Jermone Powell), with his informed insight into the monetary policy process, the regulation and supervision of the financial system, and the internationalization of financial markets.

ECON588 Managerial Economics (3 credit hours)

This course provides a rigorous and integrative study of topics in microeconomics and macroeconomics, with a strong emphasis on business applications. Students will explore core areas of economic theory, including consumption-based models, market efficiency, behavioral economics, individual and firm decisions, cost curves, market structures, and extend to game theory applications. The course also investigates macro-financial linkages, monetary policy impacts on financial markets, and financial crises through an economic lens, open and closed economies, and an introduction to economic history. In parallel, students will develop advanced econometric skills essential for analyzing financial and economic data.

Finance

FIN501 Financial Management (3 credit hours; required for MBA and MSBAn)

This course introduces modern financial theories, tools, and methods used to analyze financial problems. It assumes the point of view of corporate financial managers to interact with efficient capital markets. Therefore, while making the best use of constrained resources is necessary, maximizing shareholders' equity is also vitally important. The primary focus is on the analysis and forecast of internal operations and the use of short-term and long-term capital.

FIN510 Investment Analysis (3 credit hours)

This course covers the foundations of investment management. Topics include theory and empirical evidence related to portfolio theory, market efficiency, asset pricing models, factor models, and option pricing theory. Students are expected to create optimal investment strategies.

FIN512 Financial Risk Management (3 credit hours)

This course is designed to further introduce modern financial theories, tools, and methods for dealing with financial risks. Financial risk management has become an extremely important discipline for corporations, financial institutions, and many government enterprises, particularly in challenging economic times.

Prerequisite/Corequisite: FIN501 or equivalent

FIN522 International Trade and Investment (3 credit hours)

This course covers the theories of international trade through comparative advantage and related corporate strategies, the impacts of emerging regional economic blocks, the institutions of the multilateral trading system, and trade barriers. Students will learn the mechanics of international payment, shipping, and distribution.

FIN568 Corporate Finance (3 credit hours)

This course is in the accounting/finance area of interest. The first part of the course uses lectures, discussions, and case studies to cover essential corporate finance subjects, including executive compensation, corporate governance, and bankruptcy law. The second part of the course consists of discussions of corporate financing, such as mergers, acquisitions, and valuations; corporate restructuring; LBOs; MBOs; and merchant banking.

Prerequisite/Corequisite: FIN501 or equivalent

FIN580 Portfolio Management (3 credit hours)

This course teaches advanced portfolio decision-making. Topics include index models, portfolio performance measures, bond portfolio management and interest immunization, stock market anomalies, and market efficiency.

Prerequisite/Corequisite: FIN501 or equivalent

FIN585 International Finance (3 credit hours)

This course prepares the students for a career in international finance by discussing the financial environment in which a multinational firm and its managers must function. It focuses on foreign exchange management and financial management in a multinational firm. It points out to the students the basic principles of profit-seeking and risk-avoidance practices in the volatile global financial markets.

Prerequisite/Corequisite: FIN501 or equivalent

Green Business Management

GBM500 Green and Socially Responsible Management (3 credit hours)

On completing this course, students will be able to (a) identify and explain multiple environmental and social responsibility demands being faced by modern businesses, (b) utilize socially responsible methodologies and best- practices in the production of products and the delivery of services to generate societal benefits beyond classic financial profit and (c) formulate enterprise-wide policies which integrate social responsibility and green sustainability values.

Human Resource Management

HRM531 Human Resource Management (3 credit hours)

This course provides students and practicing managers with a comprehensive overview of essential personnel management concepts and techniques. The focus is on essential topics such as job analysis, candidate screening, interviewing, testing, hiring, evaluating, training, motivating, promoting, and compensating and their associated legal constraints.

Additional topics covered include global HR, diversity awareness and training, and sexual harassment legal requirements. Practical applications such as how to appraise performance and benefits and handle grievances are explored. Additionally, developing independent work teams that foster creativity and innovation will be discussed.

HRM532 Strategic Workforce Planning (3 credit hours)

This course begins with discussing the need for workforce planning and gives samples of plans developed for various types of organizations such as manufacturing, high-tech, small business, and so on. This course provides students with an opportunity to learn about and develop a workforce plan as part of the business plan and also an ongoing dynamic document developed as a part of the strategic planning component of the organization. It also concerns scheduling, rosters, and succession planning, which is a process of identifying a long-term plan for the orderly replacement of key employees. The course also explores cases of developing a gap analysis to determine manpower needs and budgeting for the manpower needs. Developing new HR workforce configurations such as self-managed teams, telecommuting, outsourcing, temps-to-hire, and other methods to make companies more flexible and offer economical solutions to the high cost of knowledge workers. The course includes case studies and the actual writing of several workforce plans for various sizes of organizations.

Management

MGT450G Organizational Behavior and Management (3 credit hours)

This course explores the complex dimensions of organizational behavior, including the examination of experiential and conceptual approaches to communication, self-awareness, perception, motivation, problem-solving, and culture. Students apply interpersonal and intrapersonal exploration to manage change, leadership theories, and organizational issues.

MGT451G Project Management (3 credit hours)

This course introduces the principles of project and program management, the roles of project management, matrix organization in both private and public segments, and project management techniques leading to the efficient execution and completion of projects.

Proposal development, case studies, and independent projects are required.

MGT460G Production and Operations Management (3 credit hours)

This course balances the theory and practice of production and operations management, covering quantitative, qualitative, and behavioral aspects. Students will learn how to identify and apply strategies, business process design principles, and quantitative techniques. This knowledge will then be applied to optimize business operations, enhance efficiency, and improve competitiveness. Students will develop quantitative models and use software tools such as Microsoft Excel Analysis Tool Pak and Solver to create solutions for multivariate operational constraints. Typical control cases include service and product design choices, sales forecasting, scheduling, metrics for production/inventory control, statistical quality control, and logistical constraints.

MGT460LG Production and Operations Management Lab (1 credit hour)

During this hands-on lab course, students will learn software-based techniques to solve various time, labor, material, forecasting, and capacity issues; take control of the conversion process from inputs to outputs; and perform cost optimizations in classic production planning and operations scenarios. This lab course is designed to be taken concurrently with the MGT460LG course. However, it is a separate course with its own separate syllabus and topics. Students will be expected to develop their own mathematical models, transform their models into software-based implementations, and then determine the optimized best-fit business solution. Students should be comfortable with, or refresh themselves on, solving multivariate simultaneous equations before the first-class meeting. Students should also be comfortable installing software on their machines or using cloud-based services.

Prerequisite/Corequisite: MGT460

MGT480G Entrepreneurship (3 credit hours)

This course explores the full range of entrepreneurial processes, including the evaluation, development, and creation of a successful business. It will help potential entrepreneurs and professionals visualize and experience entrepreneurial development. The course explores the entrepreneurial approach to resources, such as developing an organizational structure, market analysis, financing entrepreneurial ventures, and screening venture opportunities. Individuals will experiment and evaluate what it takes to be an entrepreneur, including developing a plan for a new business.

MGT482G Launching Innovative Startups (3 credit hours)

From introduction to mastery, this hands-on project-based course is ideal for entrepreneurs, future entrepreneurs, business owners, and innovators alike. To put your dream into action, the logical entrepreneur development process will be covered from the ideation and business modeling phases through the funding and marketing launch phases.

Discussions are flexible, with student-suggested topics welcome, such as design thinking, lean startup, validating the market opportunity, tips for successful start-up team management, low-cost marketing tactics, pricing strategy, and so on.

MGT483 Business Innovation – A Historical and Cultural Perspective (3 credit hours)

This course explores the evolution of business innovation through the lens of history, culture, and global influence. Students will examine how groundbreaking ideas, products, and business models have emerged across different eras—from the Industrial Revolution to the digital age—and how cultural contexts have shaped their development and adoption. Through case studies spanning diverse regions and industries, the course analyzes the social, economic, and technological forces that drive innovation, as well as the leadership strategies that enable its success. Topics include the role of entrepreneurship in economic transformation, cross-cultural approaches to problem-solving, and the interplay between tradition and disruption. By connecting past innovations to contemporary business challenges, students will gain the historical insight and cultural awareness needed to envision and lead future change.

MGT491G Agility-Based Leadership (3 credit hours)

Using Business Agility Institute's (BAI) best practices to cultivate adaptive and resilient organizations through cultural engagement, agile principles, and operational efficiency. Through real-world case studies and interactive projects, students will judge strategies for fostering a dynamic and engaged workforce for delivering value. We will explain the performance driven business models and designing optimized operations for driving continuous improvement to meet evolving market demands. By the end of this course, students will be equipped with the skills and knowledge necessary to design organizational framework for cultural transformation, operational flexibility, and workforce engagement.

MGT500 Risk Management (3 credit hours)

This course is designed to teach the students risk management concepts, processes, and strategy making and implementation in a corporate environment. Topics covered include the nature and concept of risks, risk management structure and process flow, information and gathering techniques, data analysis methodology and tools, and risk management techniques. Case studies and a project are required.

MGT501 Agile Project Management (3 credit hours)

Agility in management has been a hallmark factor behind many Silicon Valley success stories. The scrum-based agile approach stands in stark contrast to traditional approaches that rely on slow bureaucratic and paperwork-heavy planning approaches. After introducing scrum, students will master scrum's adaptive principles, plus its iterative and incremental methodologies and learn how to apply them from small projects to large programs.

Students as project managers will learn how to create "user stories," apply multiple estimation techniques, pivot appropriately to changing requirements, enhance customer collaborations, measure progress, measure value, reduce costs, and ensure technical excellence. Course knowledge also includes sprints, multilevel planning, estimation and velocity, product functionality backlog, and the roles of different team members roles (Scrum Master, Product Owner, and Development Team Member). To provide students with additional theoretical depth throughout the course, classical and alternative project management frameworks will be contrasted and trade-offs compared.

MGT510 Strategic Management & Leadership (3 credit hours; required for MBA and MSBAn)

The landscape across the business sector is in constant change. Adapting and succeeding to such changes to market demands requires an understanding of principles in strategic management and leadership. Students will explore and apply critical thinking in some of the key pillars of business: ethics, culture and leadership; effective job design; decision-making within a dynamic team environment; problem diagnosis and development of plans for change; and implementation and evaluation of change initiatives. Students will demonstrate their comprehensive learning through a team-based culminating project serving in the role of "consultants" of a business organization.

MGT530 Logistics and Operations Management (3 credit hours)

The field of logistics and operations management optimizes the management of continuous activities of the processes of production, warehousing, transportation of goods, and the delivery of services. The combination of e-commerce and globalization has created many challenges with new behaviors, increased product variety, technological advancement, and deep integration with other functional areas of the business (sales, marketing, finance, etc.). In this course, students will learn how to use quantitative-based analytical techniques to make logistics and operations decisions.

MGT538 International Business Management (3 credit hours)

In this course, students will begin by appraising and deconstructing the environment of international business by examining the economic, financial, political, and cultural aspects of global trade. They will then learn how to assess and critique global organizational design and international business management techniques for various situations. After examining business practices and opportunities in various regions around the world, students will prepare a country screening analysis or similar project as a way to apply their knowledge of strategic international business management concepts to real-world situations.

MGT540 Management of Innovation (3 credit hours)

This course is designed to equip the students with the knowledge and management skills to address the needs of new and innovative enterprises in a changing and uncertain environment. Topics include technology forecasting and assessment, program or product selection and control, market development, financial management, regulations, and ethics.

MGT542 Technology and Product Management (3 credit hours)

Designed to give students practical experience in product development, this course focuses on managing engineering and technology activities. Topics include technology product design, planning, production, marketing, sales, and maintenance; technological product life cycle from research and development through new product introduction; marketing requirement documentation (MRD); product positioning; channel inventory management; outbound communications; and the organizational role of the product marketing manager. Case studies and project presentations are required.

MGT550 Global Outsourcing and Vendor Management (3 credit hours)

In today's increasingly competitive and globalized business landscape, effective global outsourcing management has emerged as a critical area of focus for organizations. As companies strive to enhance their performance and gain a competitive edge, managing suppliers play a pivotal role in shaping overall costs and facilitating differentiation strategies. This course offers students a comprehensive understanding of the profound impact that sourcing and supply management have on the success and profitability of modern businesses. It delves into the intricacies of sourcing and supplier management decisions, considering factors such as costs, pricing dynamics, ethical considerations, globalization trends, and risk management strategies. Furthermore, it explores how sourcing and supply management practices interact with other organizational functional areas, including product design and inventory management. Through a blend of engaging lectures and in-depth case study discussions, students will gain practical insight into the complexities of sourcing and supply management, equipping them with the knowledge and skills needed to navigate these challenges effectively in today's dynamic business environment.

Marketing

MKT450G Marketing Management (3 credit hours)

This course studies marketing management by analyzing real-world cases. Students will learn to implement and execute the marketing process through situation assessment, strategy formulation, marketing planning, and marketing implementation and evaluation.

MKT483G Monetizing Intellectual Property (3 credit hours)

Intellectual property (IP) is a firm's highly valuable asset. Ideal for social media content creators and going beyond traditional IP definition and usage, students in this course will learn innovative models and interesting strategies for generating capital and value from intangible assets. The rapidly growing U.S. market for leasing intellectual property is already greater than $63 billion per year. Course topics include Outright Sales, Third-Party Licensing, Royalty Securitizations, Bowie Bonds, Collateralization, Donations, Copyrights, Trademarks, Trade Secrets and Patents, etc. This course contains assignments with research and role-playing.

MKT491G The Art of Negotiation (3 credit hours)

This course will enable students to acquire comprehensive knowledge and develop advanced skills to navigate complex negotiation scenarios and influence various stakeholders, including customers, vendors, managers, peers, and direct reports. Throughout the course, students will analyze and apply theories and practical strategies to achieve mutually beneficial outcomes, commonly known as win-win solutions. The curriculum emphasizes the importance of a strategic mindset, disciplined preparation, and the development of key interpersonal skills that are crucial for achieving desired objectives in negotiations. Students will engage in real-world and practical applications through case studies and simulations relevant to Silicon Valley. They will analyze various negotiation contexts, including entertainment and sports, and participate in projects focused on negotiating to maximize profitability. By integrating real-world examples with theoretical concepts, this course prepares students to apply negotiation skills effectively in diverse business environments.

MKT541 Strategic Marketing (3 credit hours)

This course will teach the students fundamental concepts and practices in marketing research and marketing data analysis, as well as using data and financial analysis to set strategic positioning strategies. Emphasis will be on practical marketing research skills development and basic analysis mechanisms leading to strategic marketing. Students will learn both primary sources (such as surveys) and secondary sources (internet, publications, etc.) through research techniques. Students will also engage in their own marketing research projects. Although statistical analysis will be covered in the course, quantitative analysis skills will be the focus. The course also covers an overview of quantitative and qualitative tools for strategic marketing, market segmentation process, strategic positioning, and channel marketing issues. Case studies and marketing requirements reports are required.

MKT542 Global Marketing (3 credit hours)

From an international business perspective, students will learn how to develop global marketing strategies involving marketing research, segmentation, and positioning. Students will then incorporate global product policy decisions into a comprehensive market entry plan or similar project to bring these marketing concepts to life.

MKT545 Global Trade and Operations (3 credit hours)

The course is designed to develop the knowledge and understanding of the global marketing environment and of the concepts, tools, and theories that will prepare the students to take responsibility for successful global market penetration for their business organization. The perspective of the course is managerial, that is, the ability to identify opportunities, resolve problems, and implement solutions and programs.

MKT550 Consumer and Buyer Behavior (3 credit hours)

In this course, students guided by the instructor will gain insight into the minds of buyers. This course applies modern behavior theory to the complex purchasing decision-making processes used by consumers and organizations. Topics include the psychology of consumption, brand loyalty, group vs. individual decision-making, intuitive vs. rational decision-making, and the like. After completing this course, the student will be able to describe key motivations within individual purchasing decisions, explain situational influences on purchasing behavior, and explain how purchasing behaviors can be integrated into marketing and sales strategies to improve revenues.

MKT551 Sales Management (3 credit hours)

With a strong focus on selling as a career, this course covers a spectrum of selling strategies, sales force management, strategic, relationship, and product selling approaches, ownership of the customer relationship, and building customer personas. Additional topics may include forecasting, pricing and negotiation strategies, recruitment, territory assignment, quotas, channel management, etc. After completing this course, the student can build and manage a sales team, formulate, and implement sales programs, and evaluate and control the sales process.

MKT552 Brand Management and Marketing (3 credit hours)

With a focus on corporate branding, this course covers building, measuring, and increasing brand equity. Topics include creating brand strategy, branding in the digital era, naming new products, building brand extensions, etc. After completing this course, the student will be able to explain the importance of brands to profitability, measure the equity value of a brand, map a brand's competitive market position, and apply brand equity to new business opportunities.

MKT553 Digital Marketing and Social Media (3 credit hours)

Using a robust combination of creativity, critical thinking, data analysis, and project tracking skills, this course will enable students to master digital marketing and social media influence. After completing this course, the student will be able to explain in detail the ASCOR digital marketing framework (assessment phase, strategy phase, channel and communication plan, digital marketing operations, refinement phase), optimize a firm's online value proposition by aligning its strengths with ever-changing market economics; and create a multistage digital marketing campaign from the initial activities through final deployment.

MKT55 Search Engine Optimization (SEO) (3 credit hours)

It is critical for your website/blog and the like to be highly ranked to achieve both high quantity and quality traffic. Compared to paid advertising, SEO is a significantly lower-cost way to build traffic. Throughout this course, students will gain insight into the algorithms and approaches used by search engines and then master common optimization techniques. Web scrapers, indexing, and other related concepts will be part of the classroom discussion. A working knowledge of HTML is assumed. Topics Include keyword research, selection of keywords, editing of website meta tags, alternatives to Google's search engine, and so on.

Professional Development

P450G Career Development (1 credit hour)

This course is designed for students to take in preparation for becoming working professionals. Topics include effective communication strategies, emotional intelligence, diversity and cultural awareness, professional behavior, and interview skills.

Social Science

SOC450G Emotional Intelligence (3 credit hours)

Emotional intelligence (EI), or emotional quotient (EQ), defines the skills or capacity to recognize one's own emotions and those of others and how to control these emotions. Unlike IQ, EQ can be increased. In this course, students will learn about EQ and its importance in their life and career. They will learn how to increase their EQ by developing their abilities to perceive, use, understand, and manage emotions. Knowing oneself is the essence of EQ. Students will learn about themselves by assessing their EQ at the beginning of the class and at the end to see if there is any

improvement. In recent years, EQ has become a major indicator of achievement. Students completing this course will have the means to increase and manage their EQ.

SOC50 Emotional Intelligence Essentials (1 credit hour)

Mastery of emotional intelligence (EI), also known as emotional quotient (EQ), is essential for successfully managing and controlling interpersonal relations. The first half of this course will focus on enhancing the students' skills at recognizing multivariate EQ issues in others and themselves. The second half of this course will focus on improving students' skills for synthesizing appropriate solutions in complex professional and personal relationships.

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