



# PHOENICIA UNIVERSITY

Innovation . Inspiration . Integrity

## College of Arts and Sciences

### Course Descriptions Catalog

2024-2025

## College of Arts and Sciences (CAS)

### 1. Department of Basic Sciences

**The Department of Basic Sciences has the following objectives:**

- Meet the university requirements in basic sciences by offering a host of courses in various disciplines of basic sciences;
- Offer courses that are required for some majors in the College of Arts and Sciences and for majors at other colleges at PU particularly the College of Engineering;
- Introduce students to the theoretical approaches and methodology of basic sciences fostering interdisciplinary perspectives and prepare them for a lifetime of critical inquiry within a liberal arts education framework; and
- Promote students' skills in oral and written communication, collaboration, creativity, and lifelong and self-directed learning.

### Course Descriptions

#### **CHEM 101. General Principles of Chemistry I - 3 cr.**

This course is an introductory one that prompts students' citizenship in scientific thinking (chemistry), covering the following topics: the atomic structure, chemical reactions, solutions, gas laws, stoichiometry, periodic relationships among the elements, chemical bonding and other basic concepts.

#### **CHEM 201. General Principles of Chemistry - 3 cr.**

This course introduces students to the general principles and theories of chemistry. Topics covered include: atomic structure, chemical bonding, stoichiometry, mass spectrum, properties of gases, basic thermodynamics, kinetic theory, solids and liquids, solutions, acids and bases, and chemical equilibrium. In this course, students connect these principles and theories to real-life examples.

#### **CHEM 202. Introductory Chemical Techniques (lab) - 2 cr.**

This course prompts students' experiential learning and inquiry in analytical chemistry through a series of laboratory experiments covering principles and experimental techniques in thermochemistry, kinetic and electrochemistry. In this course, students learn to handle basic tools and equipment as they conduct wet chemistry experiments. **Concurrent prerequisite: CHEM 201.**

#### **CHEM 209. Basic Organic Chemistry - 3 cr.**

This course is an introductory one in organic chemistry. The course stresses the relationship between the structure and properties of carbon containing molecules; it also covers stereochemistry and reactions of important functional organic groups.

**CHEM 210. Basic Organic Chemistry Lab - 1 cr.**

This course prompts basic experiments in organic chemistry. Students will develop experiential knowledge and skills in carrying several organic reactions through hands-on laboratory techniques of extraction, distillation, chromatography, and many others. **Concurrent prerequisite: CHEM 209.**

**BCHM 208. Fundamentals of Biochemistry - 3 cr.**

This course covers the study of the biochemistry of organic compounds which includes the regulation of carbohydrates, lipids, proteins, and nucleic acids, as well as their enzymatic degradation and intermediary metabolism.

**PHYS 101. Introductory Physics I - 3 cr.**

This course deals with measurements, motion in one dimension, vectors, motion in two dimensions, Newton's laws with applications, work and energy, circular motion, linear momentum and collisions, rotation and angular momentum, oscillations, gravity, and elements of fluid mechanics. **Prerequisite: MATH 101.**

**PHYS 201. Introduction to Physics - 3 cr.**

This course introduces students to different areas in classical physics: mechanics, fluid statics, fluid dynamics, temperature, heat, thermodynamics, kinetic theory of gases, heat engines, general properties of waves, sound waves and resonances, light and optics, interference, diffraction, and polarization.

**PHYS 202. Introduction to Physics Lab- 1 cr.**

This laboratory course stresses experimental knowledge to complement the theoretical knowledge learned in the introductory physics course. It includes a set of experiments such as Atwood's machine, motion down the incline, friction, Hooke's law, conservation of mechanical energy, buoyancy, heat and temperature, standing waves on a string, standing waves in air columns, reflection and refraction, and Brewster angle. **Concurrent prerequisite: PHYS 201.**

**PHYS 210. Electronics - 3 cr.**

This course is an introduction to physical electronics including DC and AC circuit theory and network analysis. It covers: band pass filter. It also explores semiconductor devices: diodes, DC power supplies, transistors, analysis and design of basic amplifiers, operational amplifiers, logic gates, timers, multiplexers, flip-flops, and counting circuits.

**PHYS 211. Electronics Lab - 1 cr.**

This laboratory course stresses experiential knowledge to complement the electronics course. It includes experiments on: DC measurements, periodic waveforms, power supplies, transients, frequency and period measurements, operational amplifiers, and some digital circuits. **Concurrent prerequisite: PHYS 210.**

**BIOL 101. Basic Concepts in Biology - 3 cr.**

This course aims to build a foundation in the knowledge of the principles of biochemistry, genetics, and molecular biology. In this course, students employ these principles to understand the functions and evolution of living systems. Students also explore the structure and regulation of genes and proteins, how these important molecules interact and are integrated within the cells, and how these cells are integrated into multicellular systems and organisms. Towards the end of the course, students select topics of interest in biology to explore and discuss in the classroom.

**BIOL 201. General Biology - 3 cr.**

This course introduces students to the levels of life's organization starting with characteristics of living organisms including bacteria, viruses, fungi, and plants, structures, functions and division of living cells, and concluding with the expression of genetic information: transcription and translation. In addition, students tackle exercises in genetics to help grasp the main modes of inheritance. Finally, the course stresses how organisms are linked together by lines of descent from shared ancestors.

The core laboratory component integrated into this course provides students with an introduction to a diverse set of analytical and quantitative skills essential for investigating the histology of different cells and tissues. Additionally, through the lab, students will develop effective communication of fundamental scientific concepts, both through written assignments and oral presentations.

**ENVT 201. Introduction to Environmental Science - 3 cr.**

This course investigates the role of humans in their environment. Students learn about their biological and physical environment. This information leads to the exploration of the human dependence on the environment and the social, technological, and industrial factors which impact the human attitude and behavior towards the environment. Emphasis is placed on sustaining resources and making informed choices concerning environmental issues.

## **2. Department of Humanities**

### **The Department of Humanities has the following objectives:**

- Meet the university requirements in humanities by offering a host of courses in key disciplines of humanities with a particular focus on Arabic and English languages;
- Offer courses that are required for various majors within the College of Arts and Sciences;
- Enhance students' proficiency in academic Arabic and English, preparing them for success in their academic pursuits and future careers;
- Cultivate students' interdisciplinary perspectives and prepare them for a lifetime of critical inquiry within a liberal arts education framework; and
- Strengthen students' skills in oral and written communication, collaboration, creativity, and lifelong independent learning.

### **Course Descriptions**

#### **ARAB 201. Arabic - 3 cr.**

This course focuses on improving students' writing skills pertinent to academic work such as writing an argumentative essay and a research report. Students read selected classical and contemporary literature, lead class discussions, give oral presentations and prepare a short research paper on a current topic.

#### **ARAB 202. Advanced Arabic - 3 cr.**

This course is a more advanced Arabic course which focuses on developing students' writing skills pertinent to academic work such as writing an argumentative essay and a research report. Students read selected classical and contemporary literature, lead class discussions, give oral presentations and prepare a short research paper on a current topic. In this course, students advance their Arabic grammar capabilities and their capabilities in Arabic rhetoric, including students' abilities to confidently employ metaphors and figures of speeches in their communication, both oral and written.

#### **INEG 200. Intensive English 2 - 0 cr.**

This twelve and a half-hour per week course is designed for low intermediate students who need to further develop their skills to enable them to cope with college-level courses. Reading themed topics, discussing them, writing about them and giving oral presentations will increase students' fluency and accuracy in English. Students' reading, writing, listening, and speaking capabilities are concurrently developed throughout this course. Students who are placed in this course may take one academic course for credit.

#### **INEG 300. Intensive English 3 - 0 cr.**

This ten-hour per week course is for intermediate level students and focuses on more complex reading skills, as well as longer essays. Reading, writing, listening, and speaking capabilities are concurrently prompted throughout various tasks and activities. Students who are placed in this course may take two courses for credit.

**ENGL 101A. Freshman English (Reading & Listening) - 3 cr.**

This course is for sophomore and freshman students to advance their English language skills, particularly reading and listening. In this course, students are exposed to various reading texts and listening tasks. Sophomore students receive no credits for this course. **Corequisite: ENGL 101B.**

**ENGL 101B. Freshman English (Writing & Speaking) - 3 cr.**

This course is for sophomore and freshman students to advance their English language skills, particularly writing and speaking. In this course, students are exposed to various writing and speaking tasks. Sophomore students receive no credits for this course. **Corequisite: ENGL 101A.**

**ENGL 201. English I - 3 cr.**

This course focuses on improving students' reading and comprehension skills and guides them through the process of writing short essays of various types such as classification, argumentation, and critique. Students are also expected to develop their listening and speaking skills, as well as grammar and vocabulary through a variety of course requirements such as class presentations and debates. **Prerequisite: Sophomore standing.**

**ENGL 202. English II - 3 cr.**

This course focuses on enabling students to use a variety of strategies to read academic and non-academic texts to build vocabulary in context. Readings from a wide range of topics will challenge students to practice and develop their language skills through discussions and written responses. Students will practice their critical thinking skills as they analyze and evaluate the readings and express their own ideas. Students enhance their research skills through collecting and analyzing information from various sources available in the library and on the Internet, and write short essays based on their critical reading of selected articles. The course requires oral presentations in class and a number of writing assignments. **Prerequisite: ENGL 201.**

**ENGL 203. Introduction to Creative Writing - 3 cr.**

This course introduces students to various forms of creative writing in fiction, non-fiction, poetry, drama, short film or novel. The course is run in the form of workshops where students share their writing with each other, and each is required to prepare a portfolio of original work. **Prerequisite: ENGL 202.**

### 3. Department of Mathematics and Informatics

**The Department of Mathematics and Informatics has the following objectives:**

- Meet the university requirements in mathematics and informatics by offering a host of courses in mathematics, statistics and informatics, to meet university-wide academic requirements;
- Offer essential courses that support various majors in the College of Arts and Sciences and other colleges at PU;
- Expose students to the theoretical approaches and methodology of mathematical sciences and informatics in order to cultivate their interdisciplinary perspectives and prepare them for a lifetime of critical inquiry within a liberal arts education framework; and
- Promote students' skills in critical thinking, problem solving, creativity, and lifelong independent learning, ensuring they are well-prepared for personal and professional growth.

#### Course Descriptions

##### **MATH 101. Calculus and Analytic Geometry I - 3 cr.**

The course covers basic concepts and methods in calculus and maps mathematics to real-life examples and situations. In this course, students go beyond mathematical procedural knowledge to acquire conceptual knowledge, procedural fluency and flexibility, and mathematical connections. Topics covered include: types and families of functions, limits, continuity, differentiation with application to curve plotting and Rolle's theorem. This course also covers integration with application to area, distance, volume, and arc-length.

##### **MATH 102. Calculus and Analytic Geometry II - 3 cr.**

The course covers concepts and methods in calculus and maps mathematics to real -life examples and situations. In addition to procedural knowledge, students develop their conceptual knowledge, procedural fluency and flexibility, and mathematical connections through covering the following topics: methods of integration, improper integrals, polar coordinates, conic sections, analytic geometry in space, parametric equations, and vector functions and their derivatives. The course also includes a 50-minute weekly solving session. **Prerequisite: MATH 101.**

##### **MATH 200. Mathematics for Social Sciences (Business Math) - 3 cr.**

This course prompts students' general calculus understanding and algebraic thinking through content enriched with real-life applications specific to students' majors (e.g. business context for business students enrolled in this course). This course covers polynomials, factoring, first- and second-degree equations, inequalities, absolute value, polynomial functions, exponential and logarithmic functions, families of functions (e.g. step functions), and differentiation. It also includes matrix operations, inverses, determinants, set operations, permutations, combinations, probability, rate of change, and techniques of integration.

##### **MATH 201. Calculus and Analytic Geometry - 3 cr.**

This course prompts students' understanding in calculus and analytic geometry. Topics covered include: integration techniques, infinite sequences and series, limits of sequences of numbers, bounded sequences, integral test for series, comparison tests, ratio and root tests, and polar functions. The course also

stresses functions of several variables, partial derivatives, cylindrical and spherical coordinates, multiple integrals, and integration in vector fields. The course also includes a 50-minute weekly solving session.

### **MATH 210. Linear Algebra - 3 cr.**

This course is an introduction to linear algebra, stressing both theory and applications. The course covers a variety of topics such as vector spaces, linear transformations and their matrix representation, linear independence, bases and dimension, systems of linear equations, orthogonal projection, least-squares approximation, orthonormal bases, matrices, determinants, and applications.

### **MATH 211. Discrete Structures - 3 cr.**

This course emphasizes the applications of discrete mathematics to computer science. It covers logical connectives, truth tables and switching circuits, normal forms, sets, relations and functions, mathematical induction, counting arguments, permutations and combinations, binomial coefficients, analysis of algorithms, complexity, graphs and trees.

### **MATH 212. Differential Equations - 3 cr.**

This course covers surface integrals, Stokes theorem, divergence theorem, first-order differential equations, linear differential equations of second and higher order, homogeneous and non-homogeneous equations with constant coefficients, power series solutions of differential equations and solutions, Bessel functions and Laplace transforms. **Prerequisite: MATH 201.**

### **MATH 213. Numerical Methods - 3 cr.**

This course offers an advanced introduction to numerical linear algebra. Topics covered include: Elementary numerical analysis: roots of equations, systems of linear algebraic equations curve fitting, integration, and solution of ordinary differential equations. Numerical techniques are presented in the context of engineering applications, and example problems are solved using a variety of computer-based tools (structure programming, spreadsheet, a computational/symbolic processing software packages). The course also includes a 50-minute weekly solving session. **Prerequisite: MATH 201.**

### **MATH 219. Visual Math & Geometry I - 3 cr.**

In this three-credit course the students are introduced to the type of (visual) math that is most relevant to students of architecture and design. It includes proportions, ratios, composition, symmetry and geometry which ranges and progresses in complexity from plane geometry to solid and space geometry, and then to descriptive geometry before they are introduced to the most relevant of non-Euclidian and advanced geometries.

### **STAT 101. Basic Statistics - 3cr.**

This course is designed to enhance students' statistical literacy and reasoning by comprehensively covering essential probability and statistics concepts. It commences with a review of key algebraic principles, including methods for determining line slopes, graphing linear equations, solving common functions, and addressing percentages and interpolation. Subsequently, the course presents its core modules, encompassing a diverse range of topics. These include exploring one-variable and two- variable data through tables, graphs, and distributions, as well as delving into data collection techniques like sampling and surveys. Furthermore, it delves into the foundational aspects of classic probability, covering conditional probability, independence, discrete and continuous random variables, and binomial and geometric random variables. The course also incorporates detailed discussions on sampling distributions, involving proportions, means, and confidence intervals, and culminates with an extensive.

### **STAT 201. Statistics - 3 cr.**

This course promotes students' statistical literacy and reasoning as it draws on the four main areas of statistics: descriptive statistics, associative statistics, inferential statistics, and probability and statistics. The course offers a general introduction to the role, importance, and significance of statistics in real-life situations and scenarios with practical emphasis on major-related settings. The course stresses a critical read and analysis of qualitative and quantitative data: graphical and numerical descriptive analysis. Additionally, the course deals with probability, discrete random variables and their probability distributions, binomial distribution, normal distribution, simple linear regression, sampling, and hypothesis testing.

### **INFO 401. Management Information Systems - 3 cr.**

This course introduces students to the basic concepts and developments in information systems with an emphasis on information technology. Topics covered include: foundation of information systems, computer technology, functional information systems, e-commerce, business intelligence and business database systems. **Prerequisite: CMPS 202 or equivalent.**

### **INFO 402. Data Analysis - 3 cr.**

This course covers quantitative and qualitative tools needed to turn data into information and information into sound decisions. Topics covered include: selecting and applying the right statistics to a question about data, inferential and advanced statistical tools, simple and multiple modeling: linear, exponential and logistic growth functions, examining data in a dataset. Additionally, selecting the right research methodology and design are addressed. **Prerequisite: CMPS 202 or equivalent.**

### **INFO 403. Business Decision Making - 3 cr.**

This course covers the principal tools and techniques used in business decision-making. Topics covered include: decision-making process, problem-solving techniques, quantitative and qualitative tools, judgment in decision making, linear programming and optimization, transportation and assignment models, project scheduling and control, inventory models, decision theory and game theory. Additionally, problems, cases and exercises are solved using Microsoft Excel and other software applications. **Prerequisite: CMPS 202 or equivalent.**

**INFO 404. Introduction to Data Science - 3 cr.**

Introduction to Data Science integrates computing, statistics and visualization and communication into the one course. The course is particularly helpful in building hands-on experience with data manipulation and analysis to finally presenting impressive results. Such results are core to enhance decision-making activities, transforming the workplace into a data driven mini-society. Students from Marketing and Entrepreneurship concentration area can take this course as well. **Prerequisites: CMPS 202 or equivalent and STAT 201.**

## 4. Department of Computer Science

### The Department of Computer Science has the following objectives:

- Meet university requirements in computer science by offering a comprehensive set of courses in programming, algorithms, software engineering, and systems analysis;
- Provide essential courses that support majors in various fields, including those in the College of Arts and Sciences and other colleges at PU;
- Expose students to the theoretical foundations and practical applications of computer science, preparing them for careers in technology and fostering their interdisciplinary perspectives within the context of a liberal arts education;
- Promote students' skills in problem-solving, logical thinking, creativity, teamwork, and independent learning, ensuring they are well-equipped for lifelong learning and adaptation in the rapidly evolving field of computer science" with "while instilling ethical practices and lifelong learning skills; and
- Equip our students with the knowledge to excel in technology-driven industries, driving innovation and meeting global demands in the evolving field of computer science.

### Course Descriptions

#### **CMPS 200. Introduction to Programming plus Lab - 3 cr.**

This course is an introductory course in programming. Topics covered include: structure of computers, the computing environment, programming, algorithm development, and a high-level language such as Java. In particular, strategies for problem solving, problem analysis, algorithm representation and algorithm verification are balanced with actual program development using good design and documentation techniques. The course also includes 2.5 teaching hours of weekly lab sessions.

#### **CMPS 202. Introduction to Computing for Arts - 3 cr.**

This course offers a broad introduction to the field of computer science, intended for arts students only. Topics include: history of computing, social issues in computing, the Internet and the World Wide Web, and social media. Students also learn common applications such as word processing, spreadsheets, and database systems.

#### **CMPS 209. Logic Design - 3 cr.**

This course introduces students to number systems, coding, and binary systems. The course also emphasizes conversion from decimal to other bases (BCD numbers). Topics include: Boolean algebra, logic gates, function minimization, tabular method, Karnaugh mapping, arithmetic functions and circuit design (HA, FA, and ALU). The course also stresses bit manipulation (basic and advanced), combinational functions, circuit design (decoder, encoder, multiplexer and de-multiplexer), sequential circuits components (latches, RS-FF, D-FF, JK-FF, T-FF), RAM structure, and logical functionality.

#### **CMPS 210. Intermediate Programming with Data Structures plus Lab - 3 cr.**

This course covers algorithm design, programming techniques, and provides a detailed study of data structures and data abstraction, in addition to complexity considerations and program verification. The course also includes 2.5 teaching hours of weekly lab sessions. **Prerequisite: CMPS 200 or GENG212.**

**CMPS 220. Low Level Programming - 3 cr.**

This course exposes students to features of the C languages commonly used in systems programming. It covers numerous aspects of the C and C++ programming languages such as: basic syntax, defining structures and classes, I/O, bit-manipulation facilities, pointers and dynamic memory, arrays, memory management, shell script programming, references, the Standard Template Library, inheritance and polymorphism. This course also includes assembly language programming & Linux shell programming.

**Prerequisite: CMPS 200; Concurrent Prerequisite: CMPS 209.**

**CMPS 223. Theory of Computation - 3 cr.**

This course exposes students to basic theoretical principles embodied in automata and formal languages. Topics include: introduction to automata and formal languages, regular expressions, finite automata, mathematical induction, correctness proofs for iterative and recursive algorithms, and recurrence equations and their solutions. **Prerequisite: CMPS 210.**

**CMPS 230. Python Boot Camp (Mandatory Workshop)**

The workshop provides a comprehensive introduction to fundamental programming concepts using Python. It covers essential topics such as strings, lists, loops, conditional statements, dictionaries, and functions. Additionally, students delve into data manipulation within Python, handling formatted datasets, and working with diverse data formats. Object-oriented programming principles, including classes and inheritance, are also explored. The workshop culminates with an overview of the Python Data Analysis Library, pandas, and the Matplotlib library for data visualization. The workshop encompasses a total of 22.5 to 24 teaching hours. **Prerequisites: CMPS 200 and CMPS 210.**

**CMPS 240. Algorithms and Data Structures - 3 cr.**

This course exposes students to standard computing algorithm design techniques and data structures. Design techniques include: divide-and-conquer, greedy strategies, dynamic programming, linear programming, randomization, and network flows. The course also covers advanced searching, sorting, selection, graph and matrix algorithms. Students will be expected to show good design principles and adequate skills at reasoning about the correctness and complexity of algorithms. **Prerequisite: CMPS 210; Concurrent Prerequisite: MATH 211.**

**CMPS 242. Computer Architecture - 3 cr.**

This course covers the fundamentals of designing digital computer systems, using modern concepts such as pipeline design, memory hierarchies, IO systems, and parallel processing. Topics include: pipelining and pipelined processors, code scheduling for ILP processors, storage systems and RAID, CPU implementation and virtual machines, memory system organization and architecture, parallel processing, machine-level representation of data, and assembly-level machine organization, among others. **Prerequisite: CMPS 210; Concurrent Prerequisite: MATH 211.**

**CMPS 243. Parallel and Distributed Computing - 3 cr.**

This course offers a formal introduction to parallel programming, focusing on multicore architectures and distributed programming techniques. It covers pertinent architectural trends and aspects of multicore systems, including the creation of multicore programs and the extraction of data parallelism using vectors and SIMD. Additionally, topics include thread-level parallelism, task-based parallelism, synchronization methods, program profiling, and performance tuning. Students are acquainted with message-passing cluster-based parallel computing. The course delves into mapping algorithms to parallel hardware and optimizing parallel code through various parallel patterns and application case studies such as vector addition, matrix multiplication, convolution, stencil computation, histogram analysis, and graph traversal. **Prerequisites: CMPS 240 and CMPS 282.**

**CMPS 245. Computer Networks - 3 cr.**

This course is an introduction to computer networks and systems programming of networks. It covers: basic understanding of computer networks and network protocols, network hardware and software, routing, addressing, congestion control, reliable data transfer, socket programming, and emerging technologies. **Prerequisites: CMPS 242 and CMPS 230.**

**CMPS 246. Network Programming - 3 cr.**

This course covers the programming aspects of networking protocols. Topics include: designing and building programming applications that use computer networks, fundamental concepts required to build iterative, and concurrent client/server networking applications using sockets. It also covers low-level networking programming and other advanced socket topics. **Prerequisite: CMPS 245.**

**CMPS 247. Computer Graphics - 3 cr.**

This course stresses the underlying mathematical foundation for and the practice of interactive graphics programming. Topics include basic graphics systems, graphics primitives and attributes, windows and viewports, clipping, geometric transformations, color systems, 2D texture mapping, and 3D graphics. The theory is complemented by a series of programming assignments and projects using C/C++, OpenGL, WebGL and OpenGL ES. **Prerequisites: CMPS 200 and CMPS 220.**

**CMPS 249. Programming Languages - 3 cr.**

This course presents the development of modern programming languages. It covers: syntax specification, the evolution of programming languages (including abstract data types and object orientation, and contributions of C++ to language design), design and implementation of subprograms, run-time storage management, and programming paradigms: functional programming (illustrated by languages such as Lisp, Scheme, ML or Haskell) and logic programming (illustrated by languages such as Prolog, XSB or Coral). **Prerequisite: CMPS 210.**

**CMPS 250. Mobile Programming - 3 cr.**

This course covers all aspects of mobile device programming, and emphasizes developing applications that run on current platforms. This course will also help students to write and deploy a content-based application using a mobile computing software framework, as well as design and build a variety of Apps throughout the course to reinforce learning and develop real competency. **Prerequisite: CMPS 220.**

### **CMPS 252. Database Systems - 3 cr.**

This course presents a technical review of the theory and principles of database design and organization. Topics covered include: the concepts and structures necessary to design and implement a database management system, network, hierarchical and relational database models, data normalization, data description languages, query languages, data integrity and security. Students also engage in application programming with SQL. **Prerequisite: CMPS 210.**

### **CMPS 255. Advanced Object-Oriented Programming - 3 cr.**

This course presents advanced object-oriented programming concepts: analysis, design patterns, and techniques using modern programming languages and frameworks. Topics covered include: graphical user interface components, event-based programming, applets, exception handling, files and streams, collections, multimedia, multi-threading, project automation, building and testing with Gradle, accessing databases, and web applications. **Prerequisite: CMPS 210.**

### **CMPS 270. Web Development - 3 cr.**

This course covers front-end and back-end web programming and concentrates on the development of dynamic web pages in a digitally-connected world. Students work on developing dynamic web pages that incorporate both client-side and server-side programming. Topics covered include: web scripting using JavaScript; Web security tools; VBScript; PHP; Java Beans; and server-side components such as CGI, ASP, and PHP, and the installation and configuration of web servers. The course also covers accessing databases through web applications.

### **CMPS 272. Software Engineering - 3 cr.**

This course surveys the fundamentals of software engineering, including the software life-cycle, requirements analysis, design, disciplined implementation and evaluation, software testing, unit, integration, validation and system testing, basic software project management and quality issues, and the documentation and technical writing. Students will work on a software project that employs principles learned in other computer science classes. **Prerequisites: CMPS 210 and CMPS270 or CMPS250.**

### **CMPS 282. Operating Systems - 3 cr.**

This course introduces students to the principles of operating systems, building upon system programming knowledge and considering the operating system as a control program and as a resource allocator. Topics include: processes and threads, synchronization and concurrency control, processor scheduling, virtual memory, memory management, file systems, scheduling and resource management, distributed systems, security and protection, the Internet, network structures, and Web technologies and operating systems (URL, HTML, HTTP, applets). **Prerequisites: CMPS 220, CMPS 242 and CMPS 252.**

### **CMPS 283. Network and Information Security - 3 cr.**

This course introduces students to the world of information and network security. Students will explore a wide range of security vulnerabilities in computing and networking systems. The course covers both fundamental and advanced topics, including cryptography, symmetric encryption, public-key cryptography, key management, hash and MAC algorithms, digital signatures, authentication applications, and access control principles. Additionally, it addresses trusted computing and multilevel security, malicious software such as worms, malware, viruses, denial-of-service attacks, and intrusion detection and prevention systems. Students will also study the design and implementation of firewall technologies for network and application security. Topics related to securing web applications, email, and IP communications are also covered. **Prerequisite: CMPS 245.**

**CMPS 284. Machine Learning - 3 cr.**

This course provides an introduction to the cross-section of fundamental methods at the core of machine learning. In this course, students discuss and implement real recent applications of machine learning in the fields of image processing, speech recognition, and web data processing. Topics covered include state-of-the-art machine learning algorithms, their theoretical foundations, and the way to apply them to real problems. **Prerequisites:** CMPS 200, MATH 201 and MATH 213; **Concurrent Prerequisites:** CMPS 210 and CMPS 220.

**CMPS 285. Artificial Intelligence - 3 cr.**

This course introduces students to the basic knowledge representation, problem-solving, and learning methods of artificial intelligence. Topics include: search methods, game playing and rule-based systems, natural language understanding, knowledge representation, reasoning, planning, vision, robotics, learning and neural networks. Assignments provide practical experience of the topics. **Prerequisites:** CMPS 210, MATH 201 and MATH 213.

**CMPS 286. Special Topic: Image Processing- 3cr.**

This course introduces students to the fundamentals of digital image processing: Digital image acquisition, formation, and perception, spatial and frequency-based image enhancement, restoration, and compression, morphological image processing, feature extraction and image segmentation, and object recognition. **Prerequisites:** CMPS 210, MATH 201 and MATH 213.

**CMPS 287. Pattern Recognition - 3 cr.**

This course introduces students to statistical pattern recognition and its applications. Topics include Bayes decision theory, maximum likelihood estimation, discriminant functions, neural networks, and support vector machines. A programming language, such as MATLAB/Python, is used for assignments and projects. **Prerequisites:** CMPS 210, MATH 201 and MATH 213.

**CMPS 288. Game Development - 3 cr.**

This course covers the fundamentals of game design and development. The course covers the different game requirements, including physics, artificial intelligence, pathfinding, and player experience. In this course, students explore player experience in terms of level design, game balance, and difficulty progression. **Prerequisite:** CMPS 210.

**CMPS 289. Computational Data Science- 3 cr.**

This course introduces the students to the field of data science, covering data visualization, modeling, analysis, prediction, and decision making. In this course, computer science students employ various tools and techniques using modern programming languages (e.g. Python) to advance their data analysis skills. **Prerequisites:** CMPS 210, MATH 201 and MATH 213.

**CMPS 290. Professional Internship - 1 cr.**

This course requires one semester of practical, on-the-job work experience and training (a minimum of 40 hours per week) at select on-campus or off-campus facilities. Students become eligible to register for this course after completing 45 credit hours. **Prerequisites:** CMPS 240, CMPS 245, CMPS 250, CMPS 252 and BCOM 300.

### **CMPS 295. Senior Project - 2 cr.**

This course provides students with the opportunity to integrate knowledge accumulated in different courses while engaging in a significant implementation project in any area of informatics or computer science. The project may be undertaken individually or in small groups under the supervision of a faculty member from the department. In this course, students are required to develop a software product that can be implemented successfully. **Prerequisite: Senior Standing.**

### **DSAI 401. Artificial Intelligence: Innovation and Applications - 3 cr.**

This course provides a practical and multidisciplinary exploration of Artificial Intelligence (AI) and its transformative applications across sectors, including marketing, operations, finance, human resources, customer service, public health and social media. Throughout the course, students will learn fundamental AI concepts such as machine learning, deep learning, and natural language processing, while understanding the distinction between narrow and general AI.

The course integrates real-world use cases that demonstrate AI's impact across sectors, such as research, content generation and personalization, decision-making, process automation, customer engagement, financial forecasting, predictive health analytics, disease surveillance, sentiment analysis, social media analytics, and audience targeting. Students will learn how to employ user-friendly, non-coding platforms to explore AI-driven tools and solutions relevant to their respective disciplines. The course also delves into the ethical considerations, governance frameworks, emerging trends and the societal implications of AI.

The course concludes with a capstone project where students collaborate to design AI-driven solutions to field-specific challenges, demonstrating the practical application of AI concepts and tools.

### **DSAI 402. Artificial Intelligence – 3 cr.**

This course introduces students to the basic knowledge representation, problem-solving, and learning methods of artificial intelligence. Topics include: search methods, game playing and rule-based systems, natural language understanding, knowledge representation, reasoning, planning, vision, robotics, learning and neural networks. Assignments provide practical experience of the topics. **Prerequisites: GENG 212, MATH 201 and MATH 210.**

### **DSAI 501. Business Analytics in Management Information Systems (MIS) – 3 cr.**

This course introduces students to the fundamental tools of business analytics within the context of Management Information Systems (MIS), including inferential analysis, machine learning, data mining, and forecasting techniques. Through experiential learning, simulations, and case studies, students will develop the skills to extract valuable insights from data and make informed business decisions that create value across various functional areas such as operations, marketing, finance, and more. They will gain an understanding of how organizations can effectively deploy data analytics techniques in the presence of numerous alternatives and business constraints.

### **DSAI 502. Strategic Management in the age of Artificial Intelligence – 3 cr.**

This course provides students with a comprehensive understanding of strategic management while paying attention to the relevant implications of Big Data and Artificial Intelligence. Through applied examples, students will learn how to formulate a coherent strategic management process that enables organizations to gain a sustainable competitive advantage in the marketplace. The course explores the integration of Artificial Intelligence technologies and data-driven insights into strategic decision-making processes. Additionally, students will develop the soft skills necessary to effectively implement strategies by gaining buy-in from key stakeholders.

**DSAI 503. Artificial Intelligence and Machine Learning Algorithms – 3 cr.**

The course offers a comprehensive exploration of introduction to Artificial Intelligence and Machine Learning algorithms. Through a practical, hands-on approach, students gain a solid understanding of the methods by implementing various algorithms themselves. They develop the skills to apply Artificial Intelligence and Machine Learning techniques to real-world problems and explore the historical development of the field.

**DSAI 504. Cutting-Edge Explorations in Artificial Intelligence – 3 cr.**

The course explores the latest advancements in Artificial Intelligence. Students gain a practical understanding of Artificial Intelligence technologies and their applications in various business domains. Through case studies and hands-on exercises, students analyze real-world scenarios and develop the skills to leverage Artificial Intelligence for business operations, decision-making, customer experience, and innovation. **Prerequisite: DSAI 503.**

**DSAI 505. Ethics and Corporate Social Responsibility: From Foundations to Big Data and Artificial Intelligence – 1 cr.**

This course delves into the fundamental concepts of ethics and corporate social responsibility (CSR) and applies them to a number of circumstances till the context of Artificial Intelligence. Through case studies, role-playing exercises, and experiential learning, students explore the crucial role of ethical values, including honesty, integrity, trust, fairness, and respect, in organizational settings. The course emphasizes the ethical dilemmas that arise when making business decisions and frames business ethics in terms of CSR. By examining the ethical implications of data-dependent business applications and Artificial Intelligence and considering the responsibilities of businesses towards society, students develop the knowledge and skills to navigate the complex landscape.

**DSAI 506. Research Methods and Big Data (Thesis) – 3 cr.**

The course provides a comprehensive immersion into the process of developing research narratives and explores the fundamental elements of research within the context of the business applications of Artificial Intelligence and Data Science. Students acquire the skills to formulate impactful research questions, conduct a thorough review of relevant literature, design suitable research methodologies, collect and analyze data, and effectively present their findings. The written output of the course will be in the form of a thesis which is a requirement for the successful completion of the MBA program. **Prerequisite: DSAI 504.**

## 5. Department of Social Sciences

### The Department of Social Sciences has the following objectives:

- Meet the university requirements in social sciences by offering a host of courses in selected disciplines of social sciences notably civilizations;
- Offer courses that are required for some majors in the College of Arts and Sciences;
- Cultivate students' interdisciplinary perspectives and prepare them for a lifetime of critical inquiry within a liberal arts education framework; and
- Promote students' skills in oral and written communication, collaboration, critical thinking, and problem solving.

### Course Descriptions

#### **CIVL 101. Youth & Rebellion in Modern Literature - 3 cr.**

This course focuses on literature produced between the 19th century and today. The course introduces the concepts of rebellion and conflict among the youth. In this course, students explore various representations of these two concepts in modern literary and philosophic works, as they read, discuss, and reflect on various selected texts.

#### **CIVL 201. World Civilizations I - 3 cr.**

This course examines the main social, economic and political features of Classical, Medieval, Islamic, and Renaissance Civilizations beginning with the Mesopotamian civilization era circa 3500 B.C. The course emphasizes the achievements of great civilizations in sciences and arts. Students are required to read, discuss and reflect on selected texts. **Concurrent prerequisite: ENGL 201.**

#### **CIVL 202. World Civilizations II - 3 cr.**

The course examines the major changes in global cultures and civilizations from the seventeenth century onward. In this course, students explore the rise of modernity and enlightenment, as well as the major cultural and intellectual features of the nineteenth and twentieth centuries. Topics covered include the philosophies and literary trends of enlightenment, scientific advancement, radical critique, the rise of psychology, colonialism and post-colonialism, and the culture of liberation. **Prerequisite: CIVL 201.**

#### **ECON 101. Survey of Economics - 3cr.**

This course introduces the basic economics principles and some examples of their applications. It will broadly cover important ideas in microeconomics (individual and collective decisions under conditions of scarcity) and macroeconomics (the dynamics and measurements of the economy as a whole). Ideas like markets, supply and demand, opportunity costs, competition, and market failures will be explored within a wider understanding of the field and its relevance to the study of business.

### **ECON 201. Economics - 3 cr.**

This course covers the basic theory and concepts of business and managerial economics. In this course, students learn how managers can make economic decisions under certainty, uncertainty and risk. Topics covered include: introduction to micro and macro-economics, marginal analysis, demand and supply concepts, forecasting techniques, time series analysis, cost and estimation, production and estimation, pricing and output determination and game theory.

### **ECON 202. Principles of Macroeconomics - 3 cr.**

This course provides an overview of macroeconomic issues, with emphasis on the determination of the aggregate level of economic activity, economic growth, employment, unemployment, interest rate, inflation and monetary and fiscal policies. The course introduces basic models of macroeconomics and illustrates different economic measures, fluctuations and growth. Topics include: supply and demand analysis, production possibilities, gross domestic product, business cycles, unemployment and economic growth, price level and inflation, aggregate demand and supply, function of money, banking system, FED system, foreign exchange, stabilization, international trade etc.

### **PSYC 101. Freshman Psychology - 3 cr.**

This course introduces students to what psychology is as a field of study and practice, highlighting major milestones in the development of psychology as a profession. In this course, students explore sensation vs. perception, emotions vs. feelings, and subjective vs. objective experiences. The course also introduces psychopathology and the roots behind mental health issues.

### **PSYC 201. Introduction to Psychology - 3 cr.**

This course introduces students to the fundamental concepts, theories, and research methods of modern psychology, beginning with a short overview of the development of the field. Major topics of psychological inquiry are covered: human development, consciousness, learning, and psychological disorders. **Concurrent prerequisite: ENGL 201.**

### **PSYC 203. Psychological Anthropology- 3 cr.**

This course introduces students to some psychological topics using anthropological concepts and methods. Topics covered include: personal identity, culture and personality, and human cognition in cultural and cross-cultural contexts. **Concurrent prerequisite: ENGL 201.**

### **SOCL 101. Introduction to Sociology I- 3 cr.**

This freshman course introduces students to basic theories, concepts, empirical concerns and analytical approaches of the discipline of sociology. The course covers basic classical and contemporary views of modern society, with a focus on the nature of community and inequality in modern societies (class, race and gender).

### **SOCL 201. Introduction to Sociology - 3 cr.**

This course introduces students to sociology as the study of human behavior. It explores the basic sociological concepts and theories, social groups, and critical social institutions. The course also examines the relationship between structure and change in society. Students are required to relate some of the concepts they learn with their everyday life experiences. **Prerequisite: ENGL 201.**

### **SOCL 210. Globalization & World Cultures - 3 cr.**

This course focuses on the practical and theoretical issues arising from globalization and cross-cultural encounters around the world. Students will acquire a strong grounding in global affairs and an understanding of the complex phenomenon of globalization. It will also help students anticipate the social, economic and political changes brought about by globalization and the resistance to it, along with the critical knowledge and skills that will set them apart in this new world and help them succeed in an increasingly globalized context. **Concurrent prerequisite: ENGL 202.**

### **COMM 101. Communication & Society - 3 cr.**

This freshman course surveys mass media, their functions, and their effects on society. It introduces the students to the development of various mass media systems and their role in society. It also examines through examples and case studies some of the social, economic, and psychological implications of the relationship between media and society.

### **COMM 102. Communication in Formal & Professional Settings - 3 cr.**

This freshman course is designed to help students employ their fundamental knowledge of the English language in professional settings which require various communication skills: verbal, non-verbal, written, and visual. The course acquaints the students with the necessary tools to adapt to different environments as they utilize the various types of communication. Particular emphasis will be given to business etiquette and netiquette, the etiquette of online communication.

### **COMM 201. Public Speaking - 3 cr.**

This course is a university requirement for all students. It aims at developing students' ability to speak fluently and effectively in public. The course discusses the characteristics of various types of speeches and speech situations. Students have to write and deliver speeches for various occasions and to different audiences and to use visuals and slideshows. **Concurrent Prerequisite: ENGL 201.**

### **COSM 200. Basic Newswriting and E-Journalism - 3cr.**

This course provides a foundational understanding of news-writing and e-journalism essentials. Students will delve into the principles of writing clear and concise news articles for both print and electronic media. Through practical exercises, students will develop proficiency and acquire basic skills in newsgathering, news-writing and exploring the fundamentals of different writing structures. **Concurrent Prerequisite: ENGL 201.**

### **COSM 201. Fundamental Issues in Media - 3cr.**

This course introduces students to major issues in media, exploring critical topics such as media diversity, the role of press in democratic societies, the transformation from traditional to digital media and the role of technology in shaping the media landscape. Students will engage in thoughtful discussions, analyze case studies, and understand the key challenges that impede a free press. Through media literacy, students will become critical consumers of news, equipped to analyze media content effectively. **Concurrent Prerequisite: ENGL 201.**

### **COSM 203. Media Law & Ethics in Journalism - 3 cr.**

This course introduces students to the study of legal and ethical dimensions of media industry. Students will learn the legal frameworks shaping media practices and the ethical considerations for responsible journalism. Students will analyze case studies, understand the important theories of ethics and the regulations of different countries. **Prerequisite: COSM 209.**

### **COSM 204. News Reporting and Writing - 3 cr.**

This course immerses students in hands-on experiences to master news audio-visual reporting and podcasting techniques. They will acquire essential skills in storytelling, scriptwriting, interviewing and multimedia production. Through practical applications, students gain the necessary skills to produce engaging podcasts and effectively convey news stories, leveraging the powerful combination of audio and visuals. **Prerequisite: COSM 200.**

### **COSM 205. Media Research Methods - 3 cr.**

This course introduces students to major communication and media research methods. Theories, models and methods are applied in development and writing a research paper. Foundational elements include quantitative and qualitative research methodologies, case studies, and the development of skills in data collection and interpretation. **Prerequisite: ENGL 201.**

### **COSM 206. Evaluating Information and Analyzing Media - 3 cr.**

This course concentrates on the analysis of social media platforms, delving into content trends, user behavior, and algorithmic dynamics. Students will develop skills in data interpretation, audience engagement strategies, and analytics specific to various platforms. The course equips students to analyze Meta social media platforms, YouTube, X, LinkedIn, and other similar platforms. **Prerequisite: ENGL 201.**

### **COSM 208. Persuasion - 3 cr.**

This course covers the key elements of persuasive communication, the advanced strategies, and the in-depth analysis of impactful speeches and persuasive messages. It equips students with effective communication techniques, the ability to craft compelling messages, understand persuasive strategies, and critically analyze influential speeches for a nuanced understanding of persuasive communication. **Concurrent Prerequisite: ENGL 202.**

**COSM 209. Exploring Digital Media and Society - 3 cr.**

This course introduces students to Mass Media theories. It provides an in-depth exploration into the foundational theories that underpin the dynamic world of mass media. Students will delve into key concepts such as agenda-setting, framing, and media effects, providing a comprehensive understanding of how media shapes and influences society. Through critical analysis of media examples and theories, students will develop the skills to evaluate the impact and implications of mass communication.

**Concurrent Prerequisite: ENGL 201.**

**COSM 210. Special Topics in Communication - 3 cr.**

This course addresses contemporary issues and topics in media and communication. The content can be either thematic/conceptual and research-based or hands-on and practice-oriented. Topics are selected by the instructor and announced prior to registration. **Prerequisite: Junior standing.**

**COSM 211. Social Media Journalism - 3 cr.**

This course is tailored to equip students with essential skills for creating impactful digital content. It focuses on the five types of content creation, exploring strategies to engage and captivate audiences across diverse social media platforms. Emphasis is placed on creating reels and videos, covering conceptualization, scripting, filming, editing, and posting to craft impactful and shareable content on social media.

**COSM 213. Social Media and News - 3 cr.**

This course integrates Adobe Premiere and other cutting-edge techniques in video production tailored for social media news. It utilizes live editing and advanced video production techniques, aiming to enhance students' skills in creating engaging and impactful social media news videos. **Concurrent Prerequisite: COSM 211.**

**COSM 214. Social Media Management - 3 cr.**

This course explores social media management practices, by exploring various applications for social media analysis and page administration. From interpreting analytics to making data-driven decisions, students gain practical insights into effectively leveraging analysis tools to optimize social media and communication strategies, as well as audience engagement. **Prerequisite: COSM 211.**

**COSM 216. Citizen Journalism - 3 cr.**

This course delves into the dynamic world of citizen journalism, illustrating how ordinary individuals contribute significantly to the news ecosystem. Through practical exercises, students will acquire the skills necessary for engaging in citizen journalism by creating their broadcasting channels and blogs. They will explore interaction across diverse social media platforms and enhance their videography and photography skills. **Concurrent Prerequisite: ENGL 201.**

### **COSM 217. Digital Media Analytics & Growth Techniques - 3 cr.**

This course familiarizes students with fundamental digital analytics concepts in marketing. It showcases how analytics aids in comprehending online consumer behavior and campaign effectiveness, empowering marketers within their current business contexts. Topics include equation formulation, data mining, KPI interpretation, and analytics reporting. **Concurrent Prerequisite: ENGL 201.**

### **COSM 218. Fake News & News Validation - 3 cr.**

In this course, students delve into discerning credible news sources amongst biased content, fake news, hoaxes, and user-generated material. They acquire systematic skills in identifying misinformation through social media verification principles, noise analysis, and detection. Additionally, students learn news verification techniques using tools such as EXIF viewers and Google Analytics. **Concurrent Prerequisite: ENGL 201.**

### **COSM 219. Netiquette and the Language of Social Media - 3 cr.**

This course delves into the principles of etiquette, professionalism, and safety in social media interactions. Furthermore, students examine the language of social media and its influence on interpersonal relationships, communities, and the portrayal of self in our digitally interconnected global society. **Concurrent Prerequisite: ENGL 201.**

### **COSM 220. Senior Project I - 2 cr.**

In this course, students will undertake an academic research paper within the field of communication and social media studies. They will employ diverse research methodologies to formulate and present their research findings. The research conducted in this course will lay the groundwork for developing a campaign in the COSM 222 course. **Prerequisite: COSM 205.**

### **COSM 221. Professional Internship - 1 cr.**

This course requires the equivalent of eight weeks of practical, on-the-job work experience and training at select on-campus or off-campus facilities. Students become eligible to register for this course after completing 45 credit hours. **Prerequisites: BCOM 300, ENGL 202, COSM 203, COSM 204, and COSM 211.**

### **COSM 222. Senior Project II - 3 cr.**

In this course, students will execute a comprehensive social media campaign based on their research topics covered in COSM 220. Applying the knowledge acquired from the communication and social media program, students will present their campaigns at the end of the semester. **Prerequisite: COSM 220.**

### **COSM 223. Digital Advertising - 3 cr.**

This course instructs students in crafting digital campaigns tailored to a diverse online audience. It covers strategies for effective online campaigns, analyzing data-driven insights, and mastering tools and platforms in digital advertising, promoting businesses, individuals, products, and diverse ideas across social media platforms. **Prerequisites ENGL 201 and COSM 209.**

**COSM 224. Political Campaigns - 3 cr.**

This course dives into the dynamics of political campaigns, including strategic planning, messaging, fundraising, and various related activities. Through case studies and hands-on simulations, students will grasp the essential components vital for successful political campaigns. **Prerequisite: ENGL 201.**

**COSM 225. Investigative Journalism - 3 cr.**

This course delves into uncovering concealed information and focuses on problem-solving to construct stories of public significance. With a practical approach, students will learn techniques to acquire and analyze data and public records from various sources, enabling them to contribute to impactful and ethically sound investigative reporting. **Prerequisite: ENGL 201.**



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