ART 488. SEMINAR IN ART. Available only by pre-approved permission of the department chair and the instructor involved. *An additional fee is charged for this course*.
One, two or three hours.

Computer Science

Dr. Dellinger, Chair; Dr. Dickinson, Dr. Hutchins, Prof. Johnson, Dr. B. Wolfe, Dr. Zhang. Additional Instructional Faculty: Dr. M. W. Bright

The Computer Science Department seeks to provide its students with a solid foundation in the field of computing in order to prepare them for employment in an exciting industry or for advanced studies in top-ranked graduate schools. This foundation is built on knowledge of mathematics, programming languages, algorithms and data structures, and theory. In addition, students explore advanced topics, research projects, and technology projects.

The Department believes that it must transmit more than technical expertise to its students: whenever possible, the curriculum emphasizes the need for students to understand their responsibilities to society and to behave ethically, as well as to strengthen and live their Christian faith and witness to the professional community.

Students who complete a Bachelor of Science in Computer Science or Computer Programming are prepared to use their computer science skills in a variety of jobs or in their graduate education. Students who complete a Bachelor of Science in Data Science are equipped with a combination of mathematics, statistics, computer science, and data science knowledge, as well as knowledge of a particular domain where they can apply data science techniques to solve practical problems. Broadly educated persons with computing skills are in great demand.

No matter what career is pursued, computing professionals must possess the ability to locate, evaluate, and use information. In addition, they must be able to communicate their ideas and conclusions clearly and coherently through the written and spoken word. Instruction in these core communication skills is provided in Computer Science 205, 350, 451, and 452, as well as DSCI 450, which cover the Writing Intensive (WI), Speaking Intensive (SI) and Information Literacy (IL) requirements. As a related concern, one of the significant problems in the computer field today is the proper application of ethics. For this reason, all computer science and computer programming majors are required to take Computer Science 205 *Ethics, Faith, and the Conscious Mind.*

The Computer Science Department has formulated the following objectives and specific outcomes to guide us in directing and evaluating our program.

Program Educational Objectives

1. Graduates active in the computer science profession will be successful because of strong technical skills, including problem-solving and programming.
2. Graduates active professionally will be successful because of strong communication and team skills.
3. Graduates' behavior will be guided by professional and ethical principles based on Biblical truths and a Christian worldview.

Student Outcomes

1. Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline
3. Communicate effectively in a variety of professional contexts

4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline
6. Apply computer science theory and software development fundamentals to produce computing-based solutions (B.S. in Computer Science only)

Computing Facility

The Computer Science department is located in the Science, Technology, Engineering, and Math (STEM) building. Students have exclusive use of two labs designed specifically to help students work collaboratively by utilizing horseshoe-shaped table and display configurations called "pods." Each of the eight pods in a room has a large monitor; students can connect their school-issued laptops to the monitor to display to their table or, with faculty permission, to show their work to the rest of class. Students also use the labs outside of class to work on group projects.

In addition, the Department has console-game development stations (e.g. Sony PS4), Apple MacBook computers, iPhones, and Android phones for mobile application development. All of this equipment is available for both class and research use. The Department also has dedicated equipment for work in computer security.

Course Requirements for Bachelor of Science Degree in Computer Science—89-92 hours

Computer Science Core Requirements (27 hours):
Computer Science 141, 155, 220, 222, 230, 244, 314, 325, and 342.

Advanced Core Requirements (23 hours):
Computer Science 205, 340, 350, 422, 424, 448, 451, and 452.

Computer Science Electives (15 hours):
Choose fifteen hours from Computer Science 390, 401, 402, 435, 441, 442, 445, 446, 447, 475, Data Science 431, 450, or Robotics 302.

Math/Science Core Requirements: (24-27 hours):
Mathematics 161, 162, and 213.
Mathematics 214; or Mathematics 222 and Statistics 331.
Choose eight credits from Physics 101; Physics 102; Chemistry 105 or both Chemistry 111 and 113; Chemistry 112 and 114; Biology 101; or Biology 102.

Note: Completing both Chemistry 105 and Chemistry 111/113 will not fulfill this this requirement.

Courses that count in the Bachelor of Science in Computer Science major quality point average (MQPA): All courses with "COMP" prefix, "DSCI" prefix, and MATH 213. A minimum MQPA of 2.00 is required to graduate.

B.S. in COMPUTER SCIENCE MAJOR FOUR-YEAR PLAN

FRESHMAN YEAR	Fall	Spr.
COMP 141 – COMP 220	3	3
COMP 155 – MATH 162	3	4
MATH 161 – Science Elective	4	4
Science Elective – WRIT 101	4	3
HUMA 102 – PHYE 100	3	1
	17	15

SOPHOMORE YEAR	Fall	Spr.
COMP 222 – COMP 205	3	3
COMP 244 – COMP 230	3	3
MATH 213 – COMP 342	4	3
HUMA 200 – MATH 214	3	4
Found. Soc. Sci. – HUMA 202	3	3
General Electives	1	
	17	16

JUNIOR YEAR	Fall	Spr.
COMP 325 – COMP 314	3	3
COMP 422 – COMP 340	3	3
Comp. Sci. Elec. – COMP 350	3	3
Comp. Sci. Electives	3	3
HUMA 301 – General Elec.	3	3
General Electives	2	1
	17	16

SENIOR YEAR	Fall	Spr.
COMP 448 – COMP 424	3	3
COMP 451 – COMP 452	2	3
Comp. Sci. Electives	3	3
HUMA 303 – General Elec.	3	3
General Electives	3	3
General Elective	1	
	15	15

Note: *Students must work with their advisor during their sophomore year to create a plan for their computer science electives, since some electives are only offered in alternate years and require certain prerequisites.*

Course Requirements for Bachelor of Science Degree in Computer Programming—60-62 hours

Computer Science Core Requirements (35 hours):
Computer Science 141, 155, 205, 220, 222, 230, 244, 325, 340 or 342, 350, 451, and 452.

Computer Science Electives (15 hours):
Choose fifteen hours from any 300-400 level Computer Science, any 300-400 level Data Science courses, or ROBO 302.

Math Requirements: (10-12 hours):
Mathematics 118 or 213.
One of Mathematics 214, Statistics 331, Statistics 131, or Psychology 201.
Mathematics 141 or 161.

Courses that count in the Bachelor of Science in Computer Programming major quality point average (MQPA):
All courses with "COMP" prefix, MATH 118, and MATH 213. A minimum MQPA of 2.00 is required to graduate.

Course Requirements for Bachelor of Science Degree in Data Science—71-75 hours

Data Science Requirements (9 hours):
Data Science 201, 431, and 450.

Computer Science Requirements (18 hours):
Computer Science 141, 155, 220, 222, 244, and 435.

Technical Elective (3 hours):
Choose one course (3 credits) from Computer Science 230, 445, Management 210, or Statistics 412.

Math and Statistics Requirements (22 hours):
Mathematics 161, 162, 213, 214, Statistics 132, and one of Statistics 131 or Psychology 201. Note: Students may substitute Mathematics 222 and Statistics 331 for Mathematics 214.

Natural Science Requirement (4 hours):
Choose one course (4 credits) from Physics 101, 102, 121, 122, Chemistry 105, 111 and 113, 112 and 114, Biology 101 and 102.

Domain Concentration (15-19 hours):
Complete one of the following concentrations:

Behavioral and Social Sciences (choose focus area from below):

- *Economics*: Economics 101, 102, 120, and six hours from any 300-400 level Economics courses.
- *Exercise Science*: Exercise Science 101, six hours from any 300-400 level Exercise Science courses (excluding Exercise Science 305), and six hours from any additional Exercise Science courses.
- *Political Science*: Political Science 104, 201, one of Political Science 204 or 205, and six hours from any 300-400 level Political Science courses.
- *Psychology*: Psychology 101, six hours from any 300-400 level Psychology courses and six hours from any additional Psychology courses (excluding Psychology 201).
- *Social Work*: Social Work 101, 264, 342, 382, and three hours from any 300-400 level Social Work courses.
- *Sociology*: Sociology 101, 377, 473, and six hours from any 300-400 level Sociology courses.

Business (choose focus area from below):

- *Accounting*: Accounting 201, 202, 301, 321, and 407.
- *Business*: Accounting 201, 202, Finance 202, Management 103, and Marketing 104.
- *Entrepreneurship*: Accounting 201, Entrepreneurship 101, 102, 201, Finance 202, and two hours from any 300-400 level Entrepreneurship courses.
- *Finance*: Accounting 201, 202, Finance 202, 332, 442, and three hours from any 300-400 level Finance courses.
- *Management*: Management 103, 457, 475, and six hours from any 300-400 level Management courses.
- *Marketing*: Statistics 131, Marketing 104, 315, 411, 415, and 419.

Natural Sciences (choose focus area from below):

- *Biology*: Biology 101, 102, 233, 234, and three hours from any 300-400 level Biology courses.
- *Chemistry*: Chemistry 111 and 113, or 105; 112 and 114, 227, 241, and three hours from any 300-400 level Chemistry courses.

- *Physics*: Physics 101, 102, 135, 234, and three hours from any 300-400 level Physics courses.

Courses that count in the Bachelor of Science Data Science major quality point average (MQPA):
All courses with "DSCI" prefix; COMP 141, 155, 220, 222, 244, 435; MATH 161, 162, 213, 214, 222; PSYC 201; STAT 131, 132, and 331. A minimum MQPA of 2.00 is required to graduate.

Course Requirements for a minor in AI and Machine Learning (19 hours)
A minor in AI and Machine Learning will consist of one of Psychology 201, Statistics 131; Mathematics 214 or both Mathematics 222 and Statistics 331; and Computer Science 222, 422, 435, and 445.

Course Requirements for a minor in Computer Science (18 hours)
A minor in Computer Science will consist of Computer Science 141, 220, 222, and nine additional hours of Computer Science courses 200-level and above.

Course Requirements for a minor in Computer Game Design and Development (18 hours)
A minor in Computer Game Design and Development will consist of Computer Science 441, 446, and 447; Writing 272; Communication Arts 135 or Design 110; and one of Computer Science 401, 402, or 445.

Course Requirements for a minor in Cybersecurity (18 hours)
A minor in Cybersecurity will consist of Computer Science 205, 340, 342, 448, 475, and Sociology 221.

Course Requirements for a minor in Data Science (24 hours)
A minor in Data Science will consist of Computer Science 141, 155, 220, 244; one of Psychology 201 or Statistics 131; Statistics 132; Data Science 201 and 431.

Course Requirements for a minor in High-Tech Entrepreneurship (18 hours)
A minor in High-Tech Entrepreneurship will consist of Computer Science 401, 402, or 442; Computer Science 451 and 452; Entrepreneurship 101 and 201; Entrepreneurship 309, 317 or 409; and Entrepreneurship 480, 360 or 460 (minimum one hour).

Students who are enrolled in Computer Programming II (COMP 220) may choose to change from COMP 220 to Computer Programming I (COMP 141) on or before the fifth week of class provided the student did not earn a C or higher in the COMP 141 course. The student must have the approval of the current COMP 220 instructor and the instructor of the COMP 141 course to which the student intends to move. The student must complete and return an Add/Drop Form to the Registrar's Office.

Students are expected to contact their advisors for a detailed schedule of courses recommended to meet requirements for a major.

Computer Science (COMP)

COMP 141. COMPUTER PROGRAMMING I. This course provides the student with an understanding of hardware and software concepts, structured program design, and programming using Java in an integrated development environment. Topics include Boolean expressions, iteration, standard library classes and methods, arrays, searching and

sorting, multidimensional arrays, strings, dynamic memory allocation, programmer-defined classes and methods, and deep copying. *Three hours.*

COMP 155. INTRODUCTION TO COMPUTER SCIENCE. This course provides an introduction to the field of Computer Science. Topics include creating precise specifications and programming solutions for basic computing problems, data representation, and a discussion of topics from the breadth of computing such as information systems, artificial intelligence, networks, and the World Wide Web. *Fall semester, three hours.*

COMP 205. ETHICS, FAITH, AND THE CONSCIOUS MIND. This course focuses on three components of ethics, faith, and philosophy from a computer science perspective. First, it examines the Christian theological and philosophical foundations of science and the ethical role of computer science in areas such as globalization, autonomous systems, and intellectual property. Second, it considers perspectives on the origins, nature, and future of human cognition and consciousness, including intersections of artificial intelligence and consciousness. Third, it reviews ethical systems, cybernetical professional codes, ethical problem-solving techniques, and specific ethical cases, again from a computer science perspective and building on an informed Christian response to technology. This course is designated Information Literacy (IL). Students may only receive credit for one of Computer Science 205 or Science, Faith, & Technology 205. Prerequisite: Humanities 102 (or Religion 211 and 212). Corequisite: a lab science. This course satisfies the SSFT General Education requirement. *Spring semester, three hours.*

COMP 211. PYTHON PROGRAMMING. A second programming course, introducing the Python language to students already familiar with basic programming concepts. Topics include Python syntax for control flow, I/O, and functions; built-in structures for lists, tuples, and dictionaries; strings and string processing; classes and inheritance; and exceptions. Students completing this course will be prepared to pass the PCEP certification for Python programmers. Prerequisite: Computer Science 141.

Offered periodically, three hours.

COMP 220. COMPUTER PROGRAMMING II. This is a second course in the Java language: a review of essential language concepts, structured programming, and top-down design. Object oriented program design principles including inheritance, abstract base classes, interfaces, virtual methods, and polymorphism are covered. Other topics include generics, linked data structures, and exception handling. Prerequisite: Computer Science 141. *Three hours.*

COMP 222. INTRODUCTION TO DATA STRUCTURES AND ALGORITHMS. An advanced course in programming using an object-oriented language, with an emphasis on analyzing the run-time behavior of programs; the design and structure of programs; linear data structures; recursion; binary search trees; sorting; and hash techniques for searching. Prerequisite: Computer Science 220. *Fall semester, three hours.*

COMP 230. ADVANCED PROGRAMMING. Introduces students to several advanced programming topics, including pointers, dynamic memory management, and principles of dynamic languages. Additional topics may include introspection and asynchronous computing. Prerequisite: Computer Science 220. *Spring semester, three hours*.

COMP 244. DATABASE MANAGEMENT SYSTEMS. An introduction to database management systems emphasizing the relational model. Topics include data manipulation languages (SQL, QBE); database design (intuitive design, normalization, and E-R design

model); three-tier and multi-tier architecture; database security; and database integrity. Prerequisite: Computer Science 220 or knowledge of its content.

Fall semester, three hours.

COMP 260. INDEPENDENT STUDY. Individual study of specialized topics in computer science. Sophomore standing, permission of the department chair, and a faculty sponsor are required. *One, two or three hours.*

COMP 270. INDEPENDENT RESEARCH. An opportunity to conduct supervised research in computer science. Sophomore standing, permission of the department chair, and a faculty sponsor are required. *One, two or three hours.*

COMP 314. AUTOMATA THEORY. This course is an introduction to computation theory including the topics: finite automata, regular languages, pushdown automata, context-free languages, Turing machines, recursive languages and functions, and computational complexity. Prerequisites: Computer Science 220 and Mathematics 213.

Spring semester, three hours.

COMP 325. COMPUTER ARCHITECTURE AND ORGANIZATION. Organization, elementary architectural design and computer instruction sets are examined and used via programming in an assembly language. Students are given an introduction to the manner in which digital computers actually work. Prerequisite: Computer Science 230.

Fall semester, three hours.

COMP 340. OPERATING SYSTEMS. A study of the basic principles of operating system design and implementation including types of computer systems, general architecture of several representative computer systems, security, run-time systems, and performance measurement and evaluation. Prerequisites: Computer Science 222 and one of Computer Science 230, Engineering 130, or Electrical Engineering 310. Corequisite: Computer Science 325 or Electrical Engineering 204. *Spring semester, three hours.*

COMP 342. DATA COMMUNICATION AND NETWORKING. This class introduces the concepts of data communications used in information networks. Topics include equipment utilization in information networks; techniques utilized to transmit signals (e.g., modulation, multiplexing, error detection, and correction); methods of message handling; network configuration; and software utilized in implementing networks. Prerequisite: Computer Science 220. *Spring semester, three hours.*

COMP 350. SOFTWARE ENGINEERING. This course introduces software-engineering methodology, covering topics such as development cycles, testing, design, requirements gathering and analysis, and project management. Students work in teams on a semester-long project. This course is designated Writing Intensive (WI) and Speaking Intensive (SI). Prerequisite: Computer Science 222 and junior standing. *Spring semester, three hours.*

COMP 360. INDEPENDENT STUDY. An advanced course for qualified students that provides an opportunity for further computer programming and analysis experience on an individual basis. Junior standing, permission of the department chair, and a faculty sponsor are required. *One, two, or three hours.*

COMP 370. INDEPENDENT RESEARCH. An opportunity to conduct supervised research in computer science. Junior standing, permission of the department chair, and a faculty sponsor are required. *One, two, or three hours.*

COMP 390. SELECTED TOPICS IN COMPUTER SCIENCE. An examination of areas of computer systems not fully covered by regular departmental offerings. Subject matter varies each offering based on topic. Prerequisites: Computer Science 220 and permission of the department. *Two or three hours.*

COMP 401. PRINCIPLES OF iOS PROGRAMMING. The objective of this course is to introduce mobile computing with an emphasis on projects and programming iOS devices. Smartphones and other Internet-based, highly mobile computing devices, are an increasingly important computing platform and driver of software design. This course covers Swift and the iOS SDK. Important software design issues, such as input modalities, UI design, and location-aware web applications are covered. Students will be provided with development systems. Prerequisite: Computer Science 222.

Alternate years, fall semester, three hours.

COMP 402. PRINCIPLES OF ANDROID PROGRAMMING. The objective of this course is to introduce Android with an emphasis on projects. Android mobile computing devices are an increasingly important computing platform. This course covers the Android SDK and teaches students how to develop basic Android applications. Students will be provided with development systems. Prerequisite: Computer Science 222.

Alternate years, fall semester, three hours.

COMP 422. THEORY OF ALGORITHMS. Topics include fundamental techniques for designing efficient algorithms and basic mathematical methods for analyzing their performance; paradigms for algorithm design; divide-and-conquer, greedy methods, graph search techniques, dynamic programming; design of efficient data structures, and analysis of the running time and space requirements of algorithms in the worst and average cases. Prerequisite: Computer Science 222 and Mathematics 213. *Fall semester, three hours.*

COMP 424. PARALLEL AND DISTRIBUTED COMPUTING. An overview of parallel architectures. Shared memory and distributed memory parallelism. Functional programming is emphasized, including its use in parallel computing. Prerequisite: Computer 222. *Spring semester, three hours.*

COMP 435. INTRODUCTION TO MACHINE LEARNING. Machine learning is an essential part of technologies such as image recognition, social network analysis, and autonomous vehicles. This course introduces concepts and algorithms that enable computers to learn from experience. Emphasis is on the practical application of the algorithms, with some discussion of the underlying mathematics. Techniques covered include supervised learning (linear and logistic regression, decision trees, support vector machines, and neural networks), unsupervised learning (clustering and dimensionality reduction), and time-series data (e.g., hidden Markov models or reinforcement learning). Prerequisites: Computer Science 222; and either Mathematics 214 or both Mathematics 222 and one of Psychology 201, Statistics 131 or 331. *Spring semester, three hours.*

COMP 441. 2D GAME DESIGN AND DEVELOPMENT. This course covers concepts and methods for the design and development of 2D computer games. Topics include sprites, animation, game design, game implementation, and game development environments. Prerequisite: Computer Science 222. *Fall semester, three hours.*

COMP 442. WEB PROGRAMMING TECHNOLOGIES. This course prepares students with the fundamentals needed to program on the Internet. It offers a survey of programming concepts that yield visible or audible results in Web pages and Web-based applications. The course covers effective Web-page design, various markup languages, several scripting

languages, Web servers, and databases to provide all the skills and tools needed to create dynamic Web-based applications. Prerequisite: Computer Science 230. Corequisite: Computer Science 244. *Fall semester, three hours.*

COMP 443. PROGRAMMING LANGUAGES. This course investigates basic concepts of programming languages, including functions, types, and scoping. Functional programming is an emphasis of the course, including first-order functions, lambda expressions, and referential transparency. Prerequisite: Computer Science 222.
Spring semester, three hours.

COMP 445. INTRODUCTION TO ARTIFICIAL INTELLIGENCE. Artificial intelligence topics included in this class are: predicate calculus, state space search, knowledge representation, expert systems, reasoning in uncertain situations, and machine learning. Prerequisites: Computer Science 222; and one of Engineering 274, Mathematics 214, or Statistics 331. *Alternate years, spring semester, three hours.*

COMP 446. 3D GAME DESIGN AND DEVELOPMENT. This course is a continuation of Computer Science 441 and is focused on the development of 3D games and other advanced game programming techniques. Topics include graphics, lighting, textures, performance, the 3D pipeline, and intentional design. Prerequisite: Computer Science 441.
Alternate years, spring semester, three hours.

COMP 447. NETWORKED GAME DESIGN AND DEVELOPMENT. This course is a continuation of Computer Science 441 and is focused on the development of networked, multiplayer console games. Topics include client/server models, synchronization, building code for single and multiplayer use, and techniques for lag mitigation. Prerequisite: Computer Science 441. *Alternate years, spring semester, three hours.*

COMP 448. COMPUTER SECURITY. An overview of software security flaws a programmer should be careful to avoid. Students will learn how to avoid these flaws, as well as practice finding them in existing code. Additionally, better alternatives will be explored which will allow students to make better programs that are less vulnerable to security exploits. Prerequisite: Computer Science 230. Corequisite: Either Computer Science 325 or Electrical Engineering 204. *Fall semester, three hours.*

COMP 451. SENIOR PROJECT I. This course is part of the capstone design experience and is based on applying software engineering to a two-semester long project. This course focuses on design. Students will write reports and make presentations. This course is designated Information Literacy (IL). Prerequisite: Computer Science 350.
Fall semester, two hours.

COMP 452. SENIOR PROJECT II. This course is a continuation of Computer Science 451 and is focused on the development of a working, tested system delivered to a user community. Students will write reports, make presentations, and deliver a working software system. This course is designated Writing Intensive (WI), Speaking Intensive (SI), and Information Literacy (IL). Prerequisite: Computer Science 451.
Spring semester, three hours.

COMP 460. INDEPENDENT STUDY. An advanced course for qualified students that provides an opportunity for further computer programming and analysis experience on an individual basis. Senior standing, permission of the department chair, and a faculty sponsor are required. *One, two, or three hours.*

COMP 470. INDEPENDENT RESEARCH. An opportunity to conduct supervised research in computer science. Senior standing, permission of the department chair, and a faculty sponsor are required. *One, two, or three hours.*

COMP 475. ADVANCED SECURITY. A more comprehensive study of computer security, including the goals of secure computing; elementary cryptography; and system and network security. Practical applications of these ideas are provided by an investigation of secure systems administration by means of team-based security projects. Various legal and ethical issues in the field are also considered. Prerequisites: Computer Science 205, 342, and 448. *Spring semester, three hours.*

COMP 480. INTERNSHIP IN COMPUTER SCIENCE. Students earn academic credit for field experience that allows them to use their computer skills under the supervision of a cooperating entity. A maximum of six credit hours may be applied toward the major. Junior standing and permission of the department chair are required. *One to six hours.*

COMP 499. HONORS IN COMPUTER SCIENCE. A course for qualified junior or senior students who are interested in an advanced computer-science experience. The course has a significant research component, including system development, review of literature, and writing. Topics change with each offering depending on the interests of the faculty member teaching the course. Prerequisite: Permission of the instructor and department chair. *One, two, or three hours.*

Data Science (DSCI)

DSCI 201. INTRODUCTION TO DATA SCIENCE. An introduction to methods and tools used to analyze and understand data. Topics include common toolkits for data analysis and visualization. Students engage in hands-on analysis of real-world data sets and discuss social issues related to data analysis. Prerequisites: Computer Science 141 and 155. Corequisite: Statistics 131 or Psychology 201. *Spring semester, three hours.*

DSCI 431. INTRODUCTION TO BIG DATA. The objective of this course is to introduce key concepts and technologies of big data management. This course covers big data characteristics, storage, and processing. Students learn how to use multiple big data technologies, such as stream processing, in-memory databases, Hadoop MapReduce, NoSQL, and NewSQL systems. Prerequisites: Computer Science 220 and 244.
Alternate years, spring semester, three hours.

DSCI 450. APPLIED MODELING AND VISUALIZATION. The capstone course in data science. Students apply modeling and visualization techniques to a large project, giving presentations about their results and writing a report. Legal and ethical issues in data science are examined. This course is designated Writing Intensive (WI), Speaking Intensive (SI), and Information Literacy (IL). Prerequisites: Mathematics 213 or Statistics 331; Mathematics 214 or 222; Data Science 201; Computer Science 222, 244; Data Science 431 or Computer Science 435. *Spring semester, three hours.*

Economics

Dr. Herbener, Chair; Dr. Frank, Dr. Fuller, Dr. Ritenour. Additional Instructional Faculty: Dr. Newman.

The mission of the School of Business at Grove City College is to equip students to pursue their unique calling to business, preparing them to be effective and ethical leaders in business and society as a whole. This mission incorporates the following learning outcomes: