HEALTH INFORMATICS (HINF)

HINF 4010 Health Informatics Communication (4 Credits)
This course will provide students with a foundational background in organizational communication strategies, develop knowledge and understanding of healthcare communication standards and policies and equip students with practical knowledge of current health informatics communication tools and trends. The student will contextualize the role of Informatics and Health Informatics/IT professionals through the development of course projects. Students will evaluate current industry communication modalities, construct plans to assess and improve communication, and advise stakeholders on how to successfully implement communication plans to achieve success in Health Informatics/IT projects. Through this process, students learn to bridge gaps between Health Informatics/IT professionals, clinicians, and health leaders.

HINF 4020 Gap Analysis for Continuous Improvement (4 Credits)
This course is designed to address the gaps faced in healthcare between existing workflows, programs, and technologies and our desired future state of care delivery. In this course, students will investigate the foundations of the current state of the delivery model, what improvement methodologies are critical to addressing the recognized gaps, how this aligns to the business needs of an organization, and considerations for proposing solutions and managing change.

HINF 4030 Healthcare Finance (4 Credits)
This course gives students a skills-based grounding in the financial management in healthcare organizations operating in the United States. Students will gain a broad overview of the business of healthcare in the U.S., including interpretation of financial statements, budgeting, operational analysis, expense management issues, revenues, and payment systems used in the current U.S. healthcare system. The course will use a case-based approach where students will demonstrate mastery of financial management skills through application of knowledge to real-life scenarios from the industry.

HINF 4210 Data Platforms in Healthcare (4 Credits)
Data Platforms in Healthcare focuses on widely used data platforms in data collection, storage retrieval, and use in healthcare and healthy-industry settings. Students will learn the flow of data from data entry to data storage, and they will learn to query, process, and present healthcare data for actionable use. Students will also learn common pitfalls of healthcare data solutions and the legal restrictions involved with personal healthcare information. Recommended prerequisite: ICT 4007 (if student has no prior programming experience).

HINF 4220 Data Mining for Health Data Science (4 Credits)
This course introduces students to the intricacies of managing, analyzing, and interpreting large-scale clinical data using advanced cloud-based tools. Designed for those with a foundational knowledge in Python and SQL, the course offers a deep dive into the real-world applications and challenges of health data mining. Students will learn to handle vast amounts of health data housed in cloud environments and use tools like a cloud data warehouse and notebooking solution for practical, hands-on experience.

HINF 4230 Healthcare Statistical Dynamics of Machine Learning (4 Credits)
HINF 4230 focuses on data cleaning, statistical analysis, and machine learning using healthcare data. Students will use Python to clean, prepare, and interpret a large dataset and then train and evaluate a machine learning model. Finally, students will debug their models and iterate to make improvements.

HINF 4240 Health Data Science Reporting (4 Credits)
This course will focus on best practices for health data science reporting to improve healthcare into the future. The learner will explore various ways to develop effective reports, inform healthcare leaders, and make appropriate recommendations. Upon completion of this course, students will understand the difference between data and how information provides key insights that allow healthcare leaders to draw conclusions, make decisions, and improve clinical and business outcomes. Preferred prerequisite: HINF 4210.

HINF 4301 Foundations of Digital Health (4 Credits)
This foundational course provides a working knowledge of key HIT definitions, concepts, and relevant advancing forms of technology. It encourages students to review the changes to HIT and evaluate the growth of these systems into the current and future forms of digital health tools. While this course is not designed to turn students into network administrators or software developers; it will equip students to become an active and valuable participant – or even a team leader – in the evaluation, selection, implementation, and ongoing operation of health information systems.

HINF 4310 Healthcare Information Systems (4 Credits)
Electronic health records systems (electronic medical records (EMRs), electronic health records (EHRs), personal health records (PHRs), and health information exchanges (HIEs)) are all the buzz these days, yet for the past 30 years the healthcare sector has clung to paper records, file folders, and clipboards. This course will explore the technical and controversial aspects of healthcare information technology in general, and the specific factors involving evaluation and adoption of EMR systems. The course also covers the fundamental components of modern electronic records systems and reviews their impact on both business and clinical functions. Key areas of interoperability, interfaces, and standards will be introduced. The course will be practical and thought-provoking as it emphasizes critical thinking and the synthesis of ideas from multiple sources and perspectives. Participants will be challenged to develop their own viewpoints and opinions, substantiated by the published work of those who are thought leaders in the field of HIT, as well as the participants' own experiences.

HINF 4315 Digital and Virtual Health (4 Credits)
With the widespread availability of health-oriented digital and virtual devices and software (apps), healthcare organizations are shifting their approaches to recognize how patients wish to communicate, manage their health, and share their health information. The shift in digital and virtual health is designed to improve healthcare access and quality—particularly in underserved populations, geographies, and specialties. This course will present the current and emerging digital and virtual health services, as well as the benefits and drawbacks of these technologies. This course will address various forms of telehealth, apps, portable devices, and remote monitoring strategies, as well as the role of artificial and augmented intelligence in enhancing digital and virtual experiences. After a broad review of the digital and virtual health field, this course will focus on evaluating, sustaining, and leading a digital or virtual program. Each lecture will discuss regulatory issues such as privacy, security, FDA review/approval, and when digital and virtual health services can be reimbursed. In addition to these regulatory issues, the course will instruct how to conduct a needs assessment, evaluate digital and virtual health products, implement different business models, and evaluate best practices for implementation and adoption. Preferred Prerequisite: HINF 4301.

HINF 4325 Values and Outcomes in Digital Health (4 Credits)
This course covers the major healthcare information technologies and topics other than electronic health records systems. Electronic health records systems represent a large focus in healthcare technology; however, many other important systems form the complete framework of modern connected healthcare. These include electronic practice management (EPM/PMS) systems, scheduling, billing, diagnostics/labs, reporting, payment interfaces, and business intelligence in healthcare. This course focuses on the fundamentals of how to be an analyst of health IT technology. Preferred prerequisite: HINF 4301.

HINF 4335 Healthcare Cybersecurity (4 Credits)
This course will introduce students to information security risks facing the healthcare industry. Students will learn how to protect healthcare organizations and their patients' data better. Students will learn about recent security breaches, the impact of those breaches on healthcare organizations, and all of the key players involved. This course also covers the evolution of healthcare IT and the continuously evolving risk and regulatory landscape. Students will explore regulations of HIPAA, NIST/ONC, HITECH, and Meaningful Use and how they relate to day-to-day operations in healthcare organizations. Additionally, this course will prepare students to support information security initiatives in order to protect the organization while furthering the advancement of healthcare IT capabilities. This is not a technical course; however, the course covers how security is impacted by technology and what one must do across technology to secure healthcare systems, organizations and patients. Preferred prerequisite: HINF 4301.

HINF 4600 Healthcare Data and Delivery by Perspective (4 Credits)
This course evaluates the environment of the U.S. healthcare delivery system and introduces the 4P (patient, provider, payer, population) perspective framework. This framework is generated from the natural flow of healthcare delivery starting with the patient, moving to the provider, towards the payer, and evolving into population health. Students will learn about the associated data that is generated from the patient as a consumer, from the provider through clinical operations, from the payer perspective, and finally how all of these contribute toward population health data. This course will cover the basics of U.S. healthcare research and clinical intervention, and students will have the ability to model the conceptual as well as practical application of health informatics.

HINF 4610 Healthcare Ethics and Biostatistics (4 Credits)
This course discusses research investigator training and outlines the progression of the Institutional Review Board (IRB) process. In addition, this IRB process will be compared with the business process improvement cycle. Health Insurance Portability and Accountability Act (HIPAA) as well as data governance issues are surveyed from the patient, provider, payer, and population perspectives. The connections between these topics and ethics are explored, and the principles of biostatistics are discussed. Common statistical packages used within healthcare research and business applications are covered, and this course concludes with an analysis of resulting ethical implications of short- and long-term healthcare data. Preferred prerequisite: HINF 4600.

HINF 4620 Healthcare Methods and Programming (4 Credits)
This course presents the basic study designs of epidemiology and illustrates the field's benefit to the healthcare industry. Randomized control trials (RCT) through correlation studies are explained through case studies as well as practical application. Informatics tools such as machine learning, clinical decision support, and natural language processing (NLP) are categorized with respect to their relative positions in the 4P (patient, provider, payer, population) perspective framework. This framework is generated from the natural flow of healthcare delivery starting with the patient, moving to the provider, progressing on to the payer, and evolving into population health. This course concludes with the many benefits of auditing as a check and balance for healthcare methods and programming. Preferred prerequisite: HINF 4600.

HINF 4630 Data Mining for Healthcare Analysis (4 Credits)
This course explores available public healthcare data sets and the data mining process. In addition, this course articulates the value of mapping relationships between data points and workflows. This process determines the level of integration of disparate data sources. Once the data sources are integrated, the focus becomes how to turn this data into information, knowledge, and insight. This course wraps up by exploring best use case scenarios for interpreting data through visualizations and predictive analytics. Preferred prerequisite: HINF 4600.

HINF 4640 Healthcare Database Applications (4 Credits)
This course covers the growing functions of security in healthcare data and specifically elaborates on the vulnerabilities and emerging solutions for dealing with data once it is stored. Database architecture is surveyed, which transitions into an exploration of terminologies and standards and how these impact interoperability of data in warehouses. A significant portion of this course focuses on the specifics of medical coding and how coding is affected by the 4P perspectives. This framework is generated from the natural flow of healthcare delivery starting with the patient, moving to the provider, progressing on to the payer, and evolving into population health. The course wraps up with a compilation of Structured Query Language (SQL) capabilities and a study of the influence of their practical application.

HINF 4650 Healthcare Project Management and Professionalism (4 Credits)
The course is designed to simultaneously teach project management concepts while preparing a student to operationalize a healthcare project. Students will analyze business problems healthcare organizations are facing to properly scope and plan a project. Students will also work on stakeholder engagement and project documentation development.

HINF 4701 Topics in Health Informatics (1-4 Credits)
This is an advanced special topics seminar course. The focus is on specialized areas of interest. Topics courses may be used as electives within the Health Informatics degree and certificates, and, with advance approval from Academic Director, may substitute for core courses in the degree or certificate programs.

HINF 4810 Survey of Health Industry Artificial Intelligence (4 Credits)
Artificial Intelligence (AI) is "the capability of a machine to imitate intelligent human behavior." AI is fast becoming a major player in the health and healthcare industries. In addition to having positive impacts in traditional medical areas such as radiology, pathology, EHR systems, oncology, and cardiology, AI is increasingly being used in the health industry to bridge gaps in the healthcare delivery systems. This course will provide students with the tools to understand how Artificial Intelligence platforms sort and learn from the immense amount of data available in the healthcare field. Students will engage in virtual learning as well as project-based learning offering the next generation of health industry professionals the skills to leverage massive amounts of data into meaningful knowledge.

HINF 4825 Technology and Applications for Telehealth and Virtual Care Success (4 Credits)
This course investigates the technology required for virtual care and technological concepts to advance virtual care models. This will include virtual care applications, telemonitoring systems, and technology concepts to include artificial intelligence, machine learning, informational robotics/applications.

HINF 4835 Design and Implementation of Telehealth and Virtual Care Systems (4 Credits)
Leaders in telehealth and virtual care settings must learn the steps to implementation when designing telehealth and virtual care systems. Students will explore the factors that impact the success of telehealth and virtual care programming, including barriers to care, the social determinants of health (SDOH), and conducting risk and benefit analysis. Students will develop the skills needed to create a telehealth and virtual care plan that builds on the development of a business case to support the needs of the community it serves.

HINF 4900 Experiential Learning in Health Informatics (4 Credits)
This course is an opportunity to participate in experiential learning by connecting academic research with a real-world healthcare management or health informatics problem. Students may take this class either early in their degree program as an introduction to healthcare or health informatics, or later in the program as a prerequisite for their upcoming Capstone experience. First, students will conduct informational interviews with healthcare management and health informatics instructors to learn more about a chosen problem. Those taking this course as an introduction will learn key skills necessary to identify an independent research project topic, formulate a research question with a business, healthcare or health industry application, investigate research methodologies, explore the requirements for human subjects research through the Institutional Review Board (IRB), and draft a project proposal. Students preparing for their Capstone experience (all health informatics students and some healthcare management students) will prepare a Capstone project proposal according to approvable structure and deliverable guidelines. They will choose and schedule a meeting with their Capstone Advisor, select a research topic, formulate a research question with an industry application, develop a thesis statement, choose appropriate project methodologies, and draft a project proposal that will meet appropriate ethics and compliance requirements for human subjects research, and submit their proposal to the IRB for approval.

HINF 4901 Capstone Project (4 Credits)
The Capstone Project provides students the opportunity to research a topic, problem, or issue within their field of study, and work individually with a Capstone advisor. Similar in weight to a thesis, but more flexible, this final project will synthesize and apply core concepts acquired from the program. The student will select an appropriate Capstone advisor who is knowledgeable in the field of study to work closely with and whom can guide the research project. Evaluation will be focused on the quality and professionalism of applied research and writing; critical and creative thinking; problem-solving skills; knowledge of research design, method, and implementation; and contribution to the field and topic of study. Please see the Capstone Guidelines for additional details. Prerequisites: A Capstone Proposal that has been approved by both the Capstone Advisor and the Academic Director, acceptance as a degree candidate, completion of at least 40 quarter-hours (including all core courses) with a cumulative GPA of 3.0 or better.

HINF 4902 Capstone Seminar (4 Credits)
The Capstone Seminar is a graduate seminar in which students utilize the knowledge and skills gained through the degree program to create a culminating work that critically addresses a problem in their degree field of study. The students produce a Capstone of 7000-8000 words that presents a position on a relevant problem, supports the position with professional and academic literature, analyzes and tests the proposed solution, and discusses the findings as related to the field of study. The seminar is dependent upon quality, collegial discussion, and feedback of students' research and work products, under the facilitation of a faculty member. The course structure guides the students through the process of independent, secondary research and writing of a Capstone. No primary research is allowed. Students generate the course content through ongoing discussion and peer feedback on the Capstone process and individual topic areas under investigation. Students professionally and academically communicate through written work and oral presentation. Students must have: Acceptance as a degree candidate, completion of at least 40 quarter-hours (including all core courses) with a cumulative GPA of 3.0 or better. Students must complete the Capstone Seminar in one quarter; no incomplete grades are assigned.

HINF 4980 Internship (0-4 Credits)
The Health Informatics Internship is designed to offer students a purposeful experience in a practical, industry related setting. The internship is an individualized learning experience. A training plan is created for each student in conjunction with the internship site supervisor to provide experiences related to the skills and knowledge covered in the certificate and master's programs as well as professional goals. Students are responsible for finding their own internship site and proposing their internship ideas. University College will send notification to all Healthcare students if they hear of internship possibilities. Students may also work through the DU career center, to explore opportunities for internship experiences.

HINF 4991 Independent Study (1-4 Credits)
This is an advanced course for students wishing to pursue an independent course of study. The student must be accepted in a degree program, have earned a grade point average of 3.0 or better, obtained the approval of the department director, and have completed the Independent Study form and filed the form with all appropriate offices before registering for the independent study. Independent Study is offered only on a for-credit basis.