

# HEALTH DATA SCIENCE (M.S.)

<https://chhs.unh.edu/health-management-policy/program/ms/health-data-science>

## Description

*Beginning in the 2023-2024 academic year, the Master of Science in Health Data Science program is pausing admissions to the program. Current students will continue to have access to the same high-quality education and resources until they graduate.*

The Master of Science in Health Data Science (MSHDS) is offered by the Department of Health Management and Policy within the College of Health and Human Services. The program is fully online starting in either the Fall semester. It can be completed full-time or part-time in as few as five semesters or up to three years. The interdisciplinary curriculum is comprised of core health data analytics and data science courses and elective courses, which may include courses in health care informatics or health systems research. Additionally, the MS in Health Data Science requires one virtual symposiums to network, learn current content and skills necessary to be an effective health data science practitioner.

The core courses develop deep quantitative tools, applications and reasoning, critical thinking and translational skills such as visualization, communication and interactive design. Students receive training in a multitude of quantitative tools and algorithms such as machine learning and deep learning, as well as how they are utilized and applied within the health care industry. Primarily using coding languages of R and Python, and SQL, students are exposed to computational and analytic environments such as enterprise systems, streaming, and distributed cloud systems.

The content is practicum driven, with each student applying core tools to address, and complete an industry real-world analytic project, while also having exposure to the processes and professional development of health data science and analytics professionals. Throughout the project, students will develop skills in project scoping, background, data transfer, and understanding policies and procedures in place via the host or by the type of data being used. Students will also engage in data mining, modelling and storytelling with outcomes for ultimate presentation back to the host site. Students will have exposure to methodologies such as LEAN and Agile project management. There will also be exposure to conceptual mapping for health data practitioners, such as design thinking. For the two required elective courses, students can choose an elective track (Health Care Informatics or Health Systems Research), or singular courses.

Graduates will have the skills necessary to function as health data science practitioners in a wide-range of roles, with the ability to adapt as needed in the dynamic, rapidly changing industry. The skills acquired in the HDS Program include health data acquisition, management, tools in cleansing tools, analytics, and techniques relative to both large and small data types and sources to interpret and present data individually and within teams.

### FLOW OF THE MS IN HEALTH DATA SCIENCE PROGRAM

The Master of Science in Health Data Science begins each Fall (August). The Fall and Spring semesters consist of two terms, (each 8-weeks in length), with electives offered Fall and Spring semesters.

## Foundation of Health Systems, Health Data Stats, Programming and Translation

The initial semester brings together both the Graduate Certificate in Health Data Science (GCHDS) students and the MS students, to learn side by side. Students learn the foundations and function of the US Health System, the basics of statistical and mathematical thinking relative to health data, programming in three languages, and the foundations of data cleaning, visualization, and presentation. In addition, a number of "soft" skills are introduced such as LEAN project management and Agile training.

### Key Program Highlights

- Gain expertise in advanced machine learning, text analytics, programming, visual analytics, and big data framework within the health care industry.
- Curriculum stays relevant to the ever-changing technology with an ability for the students to choose their specialization (i.e. Health Care Informatics or Health Systems Research)
- Students from diverse backgrounds – not just technical fields
- Work hands-on, team-based learning

## Requirements

The MSHDS requires the completion of **36** credits.

Code	Title	Credits
<b>Required Courses:</b>		
HDS 800	Mathematics and Statistics for Health Data Science	3
HDS 801	The U.S. Healthcare System	3
HDS 802	Programming in Healthcare Environments	3
HDS 803	Translation of Health Data	3
HDS 804	Health Data Systems	3
HDS 805	Applied Machine Learning in Healthcare	3
HDS 806	Outcomes Research	3
HDS 807	Unstructured Health Data	3
HDS 808	The Successful Healthcare Project	3
HDS 811	Health Data Science Practice	3
<b>Choose two electives:</b>		
Healthcare Informatics Electives		
HDS 820	Health Systems Informatics	
or HDS 821	Big Data Algorithms in Biological Sciences	
or HDS 890	HDS Independent Study	
Health Systems Research Electives		
HDS 822	AI and Deep Learning in Healthcare	
or HDS 823	Advanced Statistics in Healthcare	
or HDS 890	HDS Independent Study	
<b>Total Credits</b>		<b>36</b>

## Student Learning Outcomes

To prepare students to professionally interpret health care data and present findings to the appropriate audiences using appropriate tools and design with the following:

- Use of ethics, probability, Inference, Data Exploration and Imputation, as well as the ability to design experiments.
- Use of Databases and storage, including SQL and NoSQL, Mongo DB, AWS.
- Application programs and to address large and small data with programs such as Python, R, SAS, JMP, Tableau, Power BI, GIS/QGIS, Hadoop, Spark, Hive, Pig.

- Introductory and advanced Algorithms for text and data mining.
- Use of cleansing tools, such as Natural Language and use of Neural Networks Natural Language for translation of and processing of data for storytelling.
- Foundations and advanced of Predictive Modelling using Time Series, Forecasting, Multivariate Techniques,
- Propensity Score Matching and Clustering using Bayesian, Survival, Survey and psychometry analysis.
- Cost effectiveness using Econometrics, QALY measurement, Pharmaco-economics, Reimbursement and their relation to structure and operations and strategic decision-making.
- Policy, Population Health, Epidemiologic Methods, Governance.
- Project Management approaches with LEAN, Agile.
- Communication in all forms such as presentations, interviewing, to work in groups and individually.