

# Health Science

## Career Field Pathways and Course Structure

### Courses in Exercise Science and Sports Medicine (J6)

PATHWAY COURSES	SUBJECT CODE
Health Science and Technology <sup>1</sup>	072001
Exercise and Athletic Training <sup>2</sup>	072000
Bio-Statistics in Exercise Science and Sports Medicine	072005
Exercise Physiology and Biochemistry	072010
Nutrition and Wellness	072015
Fitness Evaluation and Assessment	072020
Athletic Injuries and Prevention	072025
Sports Exercise Psychology	072030
Medical Terminology	072150
Human Anatomy and Physiology	072040
Medical and Dental Office Technology	072155
Health Science Capstone <sup>3</sup>	072105

<sup>1</sup> First course in the Career Field; <sup>2</sup> First course in the Pathway; <sup>3</sup> Does not count as one of the required four courses.

#### Health Science and Technology

Subject Code: 072001

This first course in the career field provides students an overview of the opportunities available in the healthcare industry. Students will learn fundamental skills in effective and safe patient care that can be applied across a person's lifespan. They will also be introduced to exercise science and sports medicine, the field of biomedical research and the importance of managing health information.

#### Exercise and Athletic Training

Subject Code: 072000

In this, first course students will apply procedures and techniques used in athletic training and in the care and rehabilitation of athletic injuries and therapeutic exercise. Topics include injury prevention, conditioning, and wound care techniques of the musculoskeletal system. Students will learn techniques in the analysis of mechanical factors related to human movement. In addition, current trends, technology, legal considerations, and the role of exercise science in relationship to other health fields will be emphasized.

#### Bio-Statistics in Exercise Science and Sports Medicine

Subject Code: 072005

Students will use fundamental qualitative analysis to study the human body's responses to exercise. Topics include respiratory response to exercise, metabolism and energy production, body composition, healing rate of tissues, and cardiovascular conditioning. Students will use therapeutic exercise and the application of modalities to restore or facilitate normal function or development. Developing and implementing exercise test protocols, and emergency procedures will be emphasized.

### **Exercise Physiology and Biochemistry**

Subject Code: 072010

Students will learn to critically evaluate acute and chronic conditions associated to the human body's responses to exercise. Students will pre-screen individuals to identify the benefits and risks associated with physical activity. Students will coordinate exercise tests in order to measure body compositions, cardiorespiratory fitness, muscular strength/endurance, and flexibility. Emphasis is placed on developing conditioning programs that address pre-assessment needs, enhance mobility and build muscle strength.

### **Nutrition and Wellness**

Subject Code: 072015

Students will increase their knowledge of comprehensive health and wellness. Students will be able to identify the components of fitness and communicate the relationship between physical fitness, physical performance, injury prevention, and nutritional intake. Students will evaluate an individual's state of nutrition based upon the impact of personal choices and social, scientific, psychological and environmental influences. Further, students will calculate an individual's kilocalorie burn rate and recommend an ideal diet and physical fitness plan.

### **Fitness Evaluation and Assessment**

Subject Code: 072020

Students will complete comprehensive fitness evaluations and develop individualized training programs. Students will administer lab and field tests of cardiovascular endurance, body composition, joint flexibility and muscular strength, power, and endurance. Emphasis is placed on assessing body composition, neuromuscular flexibility, agility, balance, coordination, and proprioception. Additionally, students will identify components of physical fitness and communicate how physical activity impact health and wellness.

### **Athletic Injuries and Prevention**

Subject Code: 072025

Students will identify signs and symptoms of injury and apply emergency procedures and techniques used in the immediate care of athletic-related trauma. Students will learn clinical and field evaluative processes, injury prevention techniques, conditioning techniques, treatment, taping, bracing, and rehabilitation of musculoskeletal injuries and conditions. Students will design and implement conditioning programs, including nutritional considerations and ergogenic aids. Emphasis is placed on the synthesis of information gathered through injury history, observation, and manual muscle testing.

### **Sports Exercise Psychology**

Subject Code: 072030

Students apply practical and theoretical information as it relates to psychology of sport. Students analyze the reciprocal relations among physical activity, exercise behavior, and biochemical and physiological adaptation. Topics include theories of behavior change, exercise psychology interventions, and the relationship between exercise and mental health. Further, students will identify psychosocial determinants and effects associated with adopting and maintaining an exercise program and develop strategies for promoting optimal performance in athletes.

### **Medical Terminology**

Subject Code: 072150

This course focuses on the applications of the rules for constructing and defining medical terms with an emphasis on building a working medical vocabulary. Topics include using the appropriate abbreviations and symbols for anatomical, physiological and pathological classifications and the associated medical specialties and procedures. Students will decipher medical terms by identifying and using word elements with an emphasis on derivation, meaning, and pronunciation. Further, students will interpret and translate medical records and documents.

**Human Anatomy and Physiology**

Subject Code: 072040

In this course, students will demonstrate knowledge of body systems with emphasis on the interrelationships between structure and physical function. Students will analyze and evaluate how the body systems respond to physical activity, disease, and aging. Students will use data acquisition software to monitor abnormal physiology and body functions (e.g., muscle movement, reflex, respiratory, and voluntary actions). Further, students will analyze descriptive results of abnormal physiology and evaluate clinical consequences.

**Medical and Dental Office Technology**

Subject Code: 072155

Students will apply fundamental principles of communication, leadership, technology and management as it applies to the medical office setting. Students will demonstrate documentation and record keeping procedures set forth by national accrediting organizations.

**Health Sciences Capstone**

Subject Code: 072105

The capstone course provides opportunities for students to apply knowledge, attitudes and skills that were learned in Health Sciences program in a more comprehensive and authentic way. Capstones often include project/problem based learning opportunities that occur both in and away from school. Under supervision of the school and through community partnerships, students may combine classroom learning with work experience. This course can be delivered through a variety of delivery methods including cooperative education or apprenticeship.

## Courses in Allied Health and Nursing (JM)

PATHWAY COURSES Health	SUBJECT CODE
Science and Technology <sup>1</sup>	072001
Nutrition and Wellness	072015
Medical and Dental Office Technology	072155
Principles of Allied Health <sup>2</sup>	072035
Human Anatomy & Physiology	072040
Human Pathophysiology	072045
Patient Centered Care	072050
Patient Centered Care and Diagnostics	072055
Lifespan Development & Medical Intervention	072060
Mental Health	072065
Surgical Support	072070
Dental Technology	072075
Dental Radiography	072076
Oral Diagnosis and Treatment Planning	072080
Pharmacology	072085
Respiratory Technology	072090
Opticianry & Vision Care	072095
Clinical Laboratory Techniques	072100
Health Science Capstone <sup>3</sup>	072105
Medical Terminology	072150
Health Information Technology	072135
Health Information Management	072140
Billing and Coding	072145
Emergency Medical Technician	170345

<sup>1</sup>

<sup>2</sup>

<sup>3</sup>

*First course in the Career Field; First course in the Pathway; Does not count as one of the required four courses.*

### **Health Science and Technology**

Subject Code: 072001

This first course in the career field provides students an overview of the opportunities available in the healthcare industry. Students will learn fundamental skills in effective and safe patient care that can be applied across a person's lifespan. They will also be introduced to exercise science and sports medicine, the field of biomedical research and the importance of managing health information.

### **Medical and Dental Office Technology**

Subject Code: 072155

Students will apply fundamental principles of communication, leadership, technology and management as it applies to the medical office setting. Students will demonstrate documentation and record keeping procedures set forth by national accrediting organizations.

### **Nutrition and Wellness**

Subject Code: 072015

Students will increase their knowledge of comprehensive health and wellness. Students will be able to identify the components of fitness and communicate the relationship between physical fitness, physical performance, injury prevention, and nutritional intake. Students will evaluate an individual's state of nutrition based upon the impact of personal choices and social, scientific, psychological and environmental influences. Further, students will calculate an individual's kilocalorie burn rate and recommend an ideal diet and physical fitness plan.

### **Patient Centered Care**

Subject Code: 072050

Students will apply psychomotor nursing skills needed to assist individuals in meeting basic human needs. Students will implement interventions following a nursing assistant plan of care. Students will collect patient's vital signs including temperature, pulse rate, respiration rate, and blood pressure. Students will perform phlebotomy procedures with emphasis on infection prevention, universal precautions, proper patient identification, specimen acquisition, handling, and processing. Additionally, students will observe patients' physical, mental, and emotional conditions and document any change.

### **Human Anatomy and Physiology**

Subject Code: 072040

In this course, students will demonstrate knowledge of body systems with emphasis on the interrelationships between structure and physical function. Students will analyze and evaluate how the body systems respond to physical activity, disease, and aging. Students will use data acquisition software to monitor abnormal physiology and body functions (e.g., muscle movement, reflex, respiratory, and voluntary actions). Further, students will analyze descriptive results of abnormal physiology and evaluate clinical consequences.

### **Human Pathophysiology**

Subject Code: 072045

In this course, students will identify the causes, processes, and changes in body organs and tissues that occur with human illness. Topics include identification of clinical characteristics and effects of diseases, mechanisms causing alterations in cellular activity, maintenance of cellular tissue oxygenation, fluid and electrolyte balance, neuroendocrine control of the body, and diagnostic methodology. Students will interpret and use clinical data and patient health history to assemble a comprehensive health assessment.

## **Principles of Allied Health**

Subject Code: 072035

In this, first course students will apply knowledge and clinical skills necessary to assess, plan, provide, and evaluate care to patients in varied healthcare settings. Students will apply first aid principles and techniques needed for response to choking, cardiopulmonary resuscitation, and other life-threatening emergencies. Emphasis will be placed on regulatory compliance, patient safety, pathophysiology, and medical interventions. Additionally, this course introduces psychomotor skills needed to assist individuals in meeting basic human needs.

## **Patient Centered Care and Diagnostics**

Subject Code: 072055

In this course, students establish and implement treatment plans while providing primary nursing care. Topics include pharmacology, phlebotomy, mental health nursing and acute care nursing. Students use diagnostic techniques to develop patient health assessments. Emphasis is placed on the synthesis of information gathered through health history, observation, and the detection of deviations and variations from normal physical characteristics. In addition, students learn the legal and ethical principles needed to function within the scope of practice.

## **Lifespan Development and Medical Intervention**

Subject Code: 072060

Students gain necessary skills and knowledge to meet the needs of individuals from infancy through the human life cycle in a safe, legal, and ethical manner using the nursing process. Topics include physical, psychological, and cultural variations associated with maturing and aging. Emphasis will be placed on regulatory compliance, patient assessment, patient safety, and medical interventions. Additionally, students use psychomotor nursing skills to assist in day-to-day patient care activities.

## **Mental Health**

Subject Code: 072065

Students learn contemporary mental health theories related to psychiatric disorders and mental diseases. Students will differentiate between stress, anxiety, and crisis, and identify methods to maintain mental health, including problem-solving techniques, treatment and intervention strategies. Students will assess, plan, implement and evaluate the mental health needs of the client. Additionally, students will use therapeutic communication techniques and be able to discuss documentation guidelines and the plan of care with the patient.

## **Surgical Support**

Subject Code: 072070

Student demonstrates knowledge and skill necessary to carry out delegated tasks associated with the safe and efficient operating room support functions and related procedures. Topics include surgical technology theory, patient care concepts, and sterilization techniques. Student will assist with the passing of instruments and the positioning of patients. Additionally, students will prepare patients for transport to and from surgery, maintain equipment and supplies, and prepare the operating room for surgery.

## **Medical Terminology**

Subject Code: 072150

This course focuses on the applications of the rules for constructing and defining medical terms with an emphasis on building a working medical vocabulary. Topics include using the appropriate abbreviations and symbols for anatomical, physiological and pathological classifications and the associated medical specialties and procedures. Students will decipher medical terms by identifying and using word elements with an emphasis on derivation, meaning, and pronunciation. Further, students will interpret and translate medical records and documents.

## **Emergency Medical Technician**

### **Subject Code: 170345**

Emergency Medical Technicians are first responders who provide basic medical care to sick and injured people. In this course, students will learn the knowledge and skills necessary to provide lifesaving first aid. Students will assess, diagnose, and treat a variety of illnesses and injuries in the process of providing pre-hospital care. Students who successfully complete this course at chartered institution will be eligible to take the National Registry Exam for Ohio EMT certification.

## **Dental Technology**

### **Subject Code: 072075**

Students will demonstrate knowledge and skills associated with the practice of dentistry. Topics include principles of dental procedures and comprehensive dental care; infection control in dentistry; and dental specialties including radiology and laboratory procedures. Students will perform chair-side assisting techniques including instrument sterilization, fluoride applications, dietary analysis, and assisting physician. Emphasis is given to terminology, instruments and equipment, and patient communication. Additionally, students maintain accounts and inventory, records and appointments.

## **Oral Diagnosis and Treatment Planning**

### **Subject Code: 072080**

Students gain knowledge of head and neck anatomy with a focus on the oral cavity and teeth. They will study bone structure, cosmetic dentistry, and tooth identification and numbering systems. Students gain knowledge of chemical and physical properties of dental materials, their indications for use, and proper manipulation of the materials. Students perform radiographs, impressions, pouring, trimming, and wax bites methods and techniques. Additionally, students educate the patient on dental procedures and comprehensive dental care.

## **Pharmacology**

### **Subject Code: 072085**

Students will apply the principles of pharmacology in order to read, interpret and dispense prescriptions. They will learn how medications are classified and administered. Students will study the impact of drugs on different systems of the body, interaction of drugs, side effects and effectiveness in relation to dosages.

## **Respiratory Technology Subject**

### **Code: 072090**

Students will be able to collaborate with the respiratory therapist to administer care to patients with heart and lung disorders requiring humidity, medial gas and aerosol therapies. Students will perform diagnostic tests, clean and maintain equipment. Students observe patient responses and progress. Students apply concepts of infection control, basic therapeutic and diagnostic modalities.

## **Opticianry and Vision Care**

### **Subject Code: 072095**

In this course, students apply optometric examination techniques and applications. Topics include visual acuity, stereopsis, color vision, and Amlser grid. Additionally, students perform patient assessments; demonstrate medical interviewing techniques, collect health history content and prepare medical record documentations. Students will assist patients in frame selection and fittings and educate patient in comprehensive vision care.

### **Clinical Laboratory Techniques**

Subject Code: 072100

Students will apply practical application of a wide range of clinical duties. Topics covered will include hematology, urinalysis, hematopoiesis processes, body chemistry, microbiology, and blood typing. Students will perform laboratory exercises illustrating principles of the cell and human physiology. Emphasis is given to safe handling, collection procedures, and preparation of specimens. Additionally, students will correlate and document clinical findings and maintain quality management in a clinical laboratory.

### **Health Information Technology**

Subject Code: 072135

This course introduces electronic health information systems, designs, implementation, and application. Students gain knowledge and skills in techniques for managing and maintaining electronic health data and compilation, analysis, of healthcare statistics, research protocols and techniques. Topics include imaging technology, information security and integrity, data dictionaries, basic statistical principles, databases, registries, descriptive statistics, research protocol monitoring, including data collection and analysis, data sources/sets, archival systems, and quality and integrity of healthcare data.

### **Health Information Management**

Subject Code: 072140

Students will collect and analyze health care data to prepare medical records. Topics include managing patient health information, administering computer systems for records management, and coding diagnosis and procedures for healthcare services. Students will analyze legal and ethical issues and the role of health records management in the industry.

### **Billing and Coding**

Subject Code: 072145

Students develop, evaluate, and implement billing and record systems for health information data using various classification systems to code and categorize patient information. Topics include health record content and structure, diagnostic coding, legal and compliance requirements. Students will record transactions, process payments, and manage patient accounts. Further, students gain knowledge using coded data to produce and submit claims to insurance companies; reviewing and appealing unpaid and denied claims; and for handling collections on unpaid accounts.

### **Health Science Capstone**

Subject Code: 072105

The capstone course provides opportunities for students to apply knowledge, attitudes and skills that were learned in Health Sciences program in a more comprehensive and authentic way. Capstones often include project/problem based learning opportunities that occur both in and away from school. Under supervision of the school and through community partnerships, students may combine classroom learning with work experience. This course can be delivered through a variety of delivery methods including cooperative education or apprenticeship.

## Courses in Medical Bioscience (J0)

	PATHWAY COURSES Health	SUBJECT CODE
	Science and Technology <sup>1</sup>	072001
	Health Science Capstone <sup>3</sup>	072105
	Principles and Practices of Biomedical Technology <sup>2</sup>	072110
	Biomedical Engineering	072115
	Biochemistry of Health	072120
	Biotechnology for Health and Disease	072125
	Genetics of Disease	072130
	Human Anatomy & Physiology	072040
	Human Pathophysiology	072045
	Medical Terminology	072150

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### Health Science and Technology

Subject Code: 072001

This first course in the career field provides students an overview of the opportunities available in the healthcare industry. Students will learn fundamental skills in effective and safe patient care that can be applied across a person's lifespan. They will also be introduced to exercise science and sports medicine, the field of biomedical research and the importance of managing health information.

### Principles and Practices of Biomedical Technologies

Subject Code: 072110

In this first course, students will use concepts, procedures, and equipment common to a professional medical laboratory. Students conduct problem-based studies, apply scientific methodology and use descriptive statistics to communicate and support predictions and conclusions. Students will follow procedures and protocols for handling, transporting, storing, and preparing specimens. Further, students will sample, monitor, and record environmental conditions of the facilities. Emphasis is given to demonstrating professional and ethical behavior associated with the medical field.

### Biomedical Engineering

Subject Code: 072115

Students learn medical interventions that extend and improve quality of life including gene therapy, use and development of prosthetics, rehabilitation techniques, and supportive care. Students will use 3D imaging, data acquisition software, and current scientific research to design and develop medical intervention products. Students will demonstrate current and emerging strategies and technologies used for collecting, analyzing, recording and sharing information. In addition, students will develop leadership and team-building skills that promote collaboration.

### **Biochemistry of Health**

Subject Code: 072120

This course introduces biochemical methods, analysis, and techniques used in the bioscience research and development industry. Students will learn the chemistry of organic macromolecules, intermediary metabolism and the relationships to the human body. Topics also include structures, properties, functions, reactivity, and synthesis of simple organic molecules. Students will monitor, record, and maintain integrity of equipment and instrumentations; environmental conditions of the facility; and inventory.

### **Biotechnology for Health and Disease**

Subject Code: 072125

This course explores techniques for extracting, separating, and assaying carbohydrates, lipids, and proteins from biological samples. Topics include mechanisms for regulating metabolism and gene expression. Students will describe the morphology and process of reproduction of microorganisms important in clinical disease and biotechnology applications. Students will perform assays as a diagnostic tool to detect the presence of a pathogen. Further, students will perform separation techniques including chemical separations, centrifugation, distillation, and filtration and interpret results.

### **Genetics of Disease**

Subject Code: 072130

Students gain knowledge and skill in genetic principles and molecular methods of analysis. Topics include enzymology, protein purification, and gene expression and organization. Students perform bio-molecular applications using knowledge of nucleic acid structure and function, DNA replication, transcription, translation, chromosome structure and remodeling and regulation of gene expression in prokaryotes and eukaryotes. Additionally, students will use electrophoresis to separate nucleic acids and proteins to determine molecular weight.

### **Health Science Capstone**

Subject Code: 072105

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### **Human Anatomy and Physiology**

Subject Code: 072040

In this course, students will demonstrate knowledge of body systems with emphasis on the interrelationships between structure and physical function. Students will analyze and evaluate how the body systems respond to physical activity, disease, and aging. Students will use data acquisition software to monitor abnormal physiology and body functions (e.g., muscle movement, reflex, respiratory, and voluntary actions). Further, students will analyze descriptive results of abnormal physiology and evaluate clinical consequences.

### **Human Pathophysiology**

Subject Code: 072045

In this course, students will identify the causes, processes, and changes in body organs and tissues that occur with human illness. Topics include identification of clinical characteristics and effects of diseases, mechanisms causing alterations in cellular activity, maintenance of cellular tissue oxygenation, fluid and electrolyte balance, neuroendocrine control of the body, and diagnostic methodology. Students will interpret and use clinical data and patient health history to assemble a comprehensive health assessment.

## **Medical Terminology**

Subject Code: 072150

This course focuses on the applications of the rules for constructing and defining medical terms with an emphasis on building a working medical vocabulary. Topics include using the appropriate abbreviations and symbols for anatomical, physiological and pathological classifications and the associated medical specialties and procedures. Students will decipher medical terms by identifying and using word elements with an emphasis on derivation, meaning, and pronunciation. Further, students will interpret and translate medical records and documents.

## Courses in Health Information Management (J7)

PATHWAY	COURSES	SUBJECT CODE
Health Science and Technology <sup>1</sup>		072001
Health Science Capstone <sup>3</sup>		072105
Health Information Technology <sup>2</sup>		072135
Health Information Management		072140
Billing and Coding		072145
Medical Terminology		072150
Human Anatomy & Physiology		072040
Medical and Dental Office Technology		072155
Data and Use		072160
Transforming Data into Information		072165
Transforming Information into Knowledge		072170
Problems and Solutions		072175

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### Health Science and Technology

Subject Code: 072001

This first course in the career field provides students an overview of the opportunities available in the healthcare industry. Students will learn fundamental skills in effective and safe patient care that can be applied across a person's lifespan. They will also be introduced to exercise science and sports medicine, the field of biomedical research and the importance of managing health information.

### Health Science Capstone Subject

Code: 072105

The capstone course provides opportunities for students to apply knowledge, attitudes and skills that were learned in Health Sciences program in a more comprehensive and authentic way. Capstones often include project/problem based learning opportunities that occur both in and away from school. Under supervision of the school and through community partnerships, students may combine classroom learning with work experience. This course can be delivered through a variety of delivery methods including cooperative education or apprenticeship.

### Health Information Technology

Subject Code: 072135

This course introduces electronic health information systems, designs, implementation, and application. Students gain knowledge and skills in techniques for managing and maintaining electronic health data and compilation, analysis, of healthcare statistics, research protocols and techniques. Topics include imaging technology, information security and integrity, data dictionaries, basic statistical principles, databases, registries, descriptive statistics, research protocol monitoring, including data collection and analysis, data sources/sets, archival systems, and quality and integrity of healthcare data.

**Health Information Management**

Subject Code: 072140

Students will collect and analyze health care data to prepare medical records. Topics include managing patient health information, administering computer systems for records management, and coding diagnosis and procedures for healthcare services. Students will analyze legal and ethical issues and the role of health records management in the industry.

**Billing and Coding**

Subject Code: 072145

Students develop, evaluate, and implement billing and record systems for health information data using various classification systems to code and categorize patient information. Topics include health record content and structure, diagnostic coding, legal and compliance requirements. Students will record transactions, process payments, and manage patient accounts. Further, students gain knowledge using coded data to produce and submit claims to insurance companies; reviewing and appealing unpaid and denied claims; and for handling collections on unpaid accounts.

**Medical Terminology**

Subject Code: 072150

This course focuses on the applications of the rules for constructing and defining medical terms with an emphasis on building a working medical vocabulary. Topics include using the appropriate abbreviations and symbols for anatomical, physiological and pathological classifications and the associated medical specialties and procedures. Students will decipher medical terms by identifying and using word elements with an emphasis on derivation, meaning, and pronunciation. Further, students will interpret and translate medical records and documents.

**Medical and Dental Office Technology**

Subject Code: 072155

Students will apply fundamental principles of communication, leadership, technology and management as it applies to the medical office setting. Students will demonstrate documentation and record keeping procedures set forth by national accrediting organizations.

**Data and Use**

Subject Code #072160

This foundational course focuses on the use of data and databases within the health field. Students learn what are data, how it is used and sources of data in the medical and health informatics field. They learn how to make sense of data and how data can be applied to our lives. Students will have the opportunity to interact with professionals in the health informatics field.

**Transforming Data into Information**

Subject Code #072165

Students learn how to use data to address both patient and industry needs in the health-care field. Students use software to collect and analyze data, develop a health-care registry, create a mobile app mockup and develop forms and systems to solve health-care problems. They will learn how technology can be used to create better information to inform decision making, create information from data, improve public and individual health and to protect patient privacy.

### **Transforming Information into Knowledge**

Subject Code # 072170

This advanced course allows students to make improvements in the health-care field by designing solutions using the information, knowledge and technology tools available to health informatics professionals. Students are engaged in the following activities: building a system of sharing information among health-care facilities; using social media tools to reduce diseases in foreign countries; exploring voice recognition software; using a motion-based video gaming console for rehabilitation; and exploring clinical decision rules for improving patient care.

### **Problems and Solutions**

Subject Code # 072175

In this advanced course, students study and design solutions to problems facing health-care systems. Students learn how can the health-care system work more efficiently and economically, how health-care issues in rural locations can be addressed and how various community organizations work together to improve the health of the community? Students will have the opportunity to interact with professionals in the health informatics fields.