

COURSE DESCRIPTIONS

Bio 103 Human Biology

This course provides an introduction to human biology, including the evolution, natural history, and ecology of humans. Emphasis is placed on what the biological sciences have to say about maintaining human health. Native American views of health are also discussed (3 credits).

Bio 113 People and the Environment

This course focuses on the role of people in ecosystems and the global effects of their alterations of those ecosystems. The influence of European and Native American cultures on people's activities in the ecosystem will be discussed. Alternatives for human survival and the well-being and sustainability of the biosphere will be explored (3 credits).

Bio 153 Biology

This course begins with the basic chemistry of life and proceeds through cell structure and function to animal embryology, plant life cycles, hormonally and environmentally influenced growth processes, and plant and animal anatomy and physiology (3 credits)

Bio 151 Biology I Lab

This laboratory covers the use of the microscope and other elementary laboratory equipment. Students will conduct experiments that demonstrate principles discussed in lecture. Slides of structures and organisms, as well as preserved specimens, will be used to illustrate comparative morphology and function in plants and animals (1 credit).

Bio 163 Biology II

This course emphasizes ecological and evolutionary concepts, including classification, natural history, genetics, plant and animal diversity, and behavioral ecology (3 credits).

Bio 161 Biology II Lab

This laboratory allows students to conduct experiments that demonstrate principles covered in lecture. Dissections of representative invertebrate and vertebrate organisms will be used to illustrate the comparative anatomy within the animal kingdom. 1 credit

Bio 204 Basic Microbiology

This is a survey course of bacteriology and immunology for allied health students. Emphasis is on bacterial anatomy, physiology and genetics; immune response and medical applications. The laboratory demonstrates common clinical procedures involved in the isolation and identification of the bacteria 4 credits.

Bio 223 Ecology

This course covers the interrelationship of living organisms and the environment. Topics include interactions at the population, community, and ecosystem levels; the study of energy flow, and nutrient cycling within these systems. Included also is the study of the geologic, hydrologic, and atmospheric processes involved in the maintenance of life on earth, with emphasis on the importance of human actions to promote sustainability and health of natural processes (3 credits).

Bio 224 Human Anatomy

Systematic study of gross anatomy and normal homeostasis functions of the human body. Systems studies include the skeletal, muscular and nervous systems. The laboratory is used to demonstrate these concepts through dissection and physiological experiments and demonstrations (4 credits).

Bio 234 Human Physiology

This is a continuation of Bio 224. Systems studied will include cardiovascular, respiratory, digestive, urinary, reproductive and endocrine systems (4 credits).

Bio 303 Field Ecology

This is a field course surveying the basic research methods used in sampling, and describing characteristics of plant and animal populations and communities. Emphasis will be placed on grassland, forest, wetland, and riparian systems in Southwest South Dakota (3 credits).

Biol 413 Animal Behavior

This course will present a biological perspective on the behavior of organisms from invertebrates through humans. Environmental and innate components of behavior will be discussed. Emphasis will be placed on social systems and the understanding of human behavior through comparative analyses with related social vertebrate species (3 credits).

Bio 413 Mammalogy

This course includes study of the classification, evolution, distribution, identification, life histories, and morphological, ecological, and behavioral adaptations of mammals. Emphasis is placed on species of the Great Plains ecosystem (3 credits).

Biol 453 Advanced Ecology

This course will build on information presented in general ecology, focusing on the ecology of South Dakota, with discussion of status and threats to those ecosystems. A research project will be undertaken in which the student designs a study investigating some aspect of wildlife or ecosystem interactions. Research may involve study of a local plant or animal population to better understand its ecological requirements or the investigation of a habitat and the interactions of plant and animal populations in that ecosystem (3 credits).

Biol 463 Evolution

This course will present the history of the development of the theory of natural selection and evolution as first elucidated by Charles Darwin and Alfred Wallace. The concurrent work of Mendel will be discussed as well as more modern developments in areas of genetics, molecular biology, sociobiology, paleontology, and anthropology (3 credits).

Bio 463 Conservation Biology

A study of the principles and practices associated with the maintenance of maximum biodiversity and stability of ecosystems throughout the world. The importance of retaining genetic variability in wild populations is examined (3 credits).

Chem 103 Survey of General Chemistry

An introduction to inorganic chemistry stressing basic concepts and the language of chemistry. Prerequisite: Math 134 (3 credits).

Chem 111 Chemistry for Health Sciences I Laboratory

Reinforces, in a practical format, the concepts and ideas introduced in Chem 114. Topics will include, but not be limited to, scientific concepts of weights and measures, gas law equations and calculations, solution calculations (including molarities and pH), percentage mathematics, and thermodynamic predictions and calculations. Prerequisites: Concurrent registration in Chem 114 (1 credit).

Chem 114 Chemistry for the Health Sciences

Introduces the basic concepts of general and organic chemistry helpful for nursing students. Lecture topics will include, but not be limited to Scientific Measurements, Chemical (Inorganic and Organic) Nomenclature, Molar and Percentage Mathematics, Reactions, and a study of Solutions (including pH) as well as discussions of aliphatic and aromatic organic compounds. The instructional approach of Chem 114 will emphasize how these differing chemical concepts affect the human body. Chem 114 does not satisfy the requirements for Chem 233 (4 credits).

Chem 233 General Chemistry I

An in-depth survey of inorganic chemistry. This course stresses the concepts and language of chemistry, including periodic properties, reactions, mathematics and algebraic manipulation of existing formulas, physical chemistry, and environmental issues dealing with the topic of atmospheric gases and surface groundwater. Chem 231 must be taken concurrently. Prerequisite: Math 154 or above, Chem 103 or an acceptable score on the chemistry placement examination, all courses with a grade of "C" or better
3 credits.

Chem 231 Experimental General Chemistry Lab I

The fundamentals of chemical laboratory techniques and practice, the behavior of chemical compounds and quantitative measurements illustrating the laws of chemical combinations. Prerequisite: Must be taken concurrently with Chem 233 (1 credit).

Chem 243 General Chemistry II

An advanced study of inorganic chemistry. Topics include: in-depth mathematical formulas of chemistry and their manipulation, acid-base chemistry, complex reactions and their prediction, thermodynamics, nuclear chemistry, metallurgy, and an introduction to organic chemistry. Chem 241 must be taken concurrently. Prerequisite: Chem 233 and Chem 231 both completed with a grade of "C" or better
3 credits.

Chem 241 Experimental General Chemistry Lab II

Prerequisites: Must be taken concurrently with Chem 243, or permission of instructor.
Laboratory work will complement the topics covered in Chem 243 (1 credit).

Chem 253 Organic Chemistry I

This is an introduction to organic chemistry. Topics will include nomenclature of aliphatic and basic aromatic compounds and their derivatives, reaction predictions with industrial and environmental applications, chemical properties and synthesis, and an introduction to biochemistry. Chem 251 must be taken concurrently. Prerequisites: Chem 233 and Chem 231, both with a grade of "C" or better, or permission of instructor (3 credits).

Chem 251 Organic Chemistry Lab I

Laboratory work will complement the topics covered in Chem 253. Prerequisite: Must be taken concurrently with Chem 253, or permission of instructor (1 credit).

Chem 263 Organic Chemistry II

Designed to be sequential with Chem 253, topics will include: chemistry of carbon compounds, isomerism, an introduction to nucleophilic substitution and elimination reactions, and a further examination of certain biochemistry principles such as the study of carbohydrates, lipids and proteins, including their role in metabolic reactions. Chem 261 must be taken concurrently. Prerequisite: Chem 253 and Chem 251 both completed with a grade of "C" or better (3 credits).

Chem 261 Experimental Organic Chemistry Lab II

Laboratory work that will complement the topics covered in Chem 263. Prerequisite: Must be taken concurrently with Chem 263, or permission of instructor (1 credit).

Chem 323 Environmental Chemistry

A study of the chemical nature of air, water, and earth. Some of the specific topics will include ozone layer, greenhouse effect, radioactivity, acid rain, nutrient cycles, and ecosystems. Prerequisite: Chem 243 and Math 154, both completed with a grade of "C" or better, or permission of instructor (3 credits).

Chem 351 Organic Chemistry for Educators Lab I

Prerequisite: Must be taken concurrently with Chem 353, or permission of instructor.

Laboratory work will complement the topics covered in Chem 353. A methodology component is included (1 credit).

Chem 353 Organic Chemistry for Educators I

Prerequisites: Chem 233 and Chem 231, both with a grade of "C" or better, or permission of instructor.

This is an introduction to organic chemistry. Topics will include nomenclature of aliphatic and basic aromatic compounds and their derivatives, reaction predictions with industrial and environmental applications, chemical properties and synthesis, and an introduction to biochemistry. Chem 351 must be taken concurrently. A methodology component is included (3 credits).

Chem 361 Organic Chemistry for Educators Lab II

Laboratory work will complement the topics covered in Chem 263. A methodology component is included. Prerequisite: Must be taken concurrently with Chem 363, or permission of instructor (1 credit).

Chem 363 Organic Chemistry for Educators II

Prerequisite: Chem 353 and Chem 351 both completed with a grade of "C" or better, or permission of instructor. Designed to be sequential with Chem 353, topics will include: chemistry of carbon compounds, isomerism, an introduction to nucleophilic substitution and elimination reactions, and a further examination of certain biochemistry principles such as the study of carbohydrates, lipids and proteins, including their role in metabolic reactions. Chem 361 must be taken concurrently. A methodology component is included (3 credits).

Chem 423 Laboratory Equipment

This course gives students exposure to analytical laboratory equipment used in the environmental sciences. Students will have opportunities to analyze soil, and water samples for contaminants using analytical instrumentation at the Lakota Center for Science and Technology, which may include: mass-spectrometer with gas chromatograph (GC-MS), ion chromatograph (IC), x-ray diffraction (XRD), x-ray fluorescence (XRF), atomic absorption (AA) flame and/or furnace. Prerequisites: Phys 113, Chem 243, Chem 241, Math 154 all completed with a grade of "C" or better (3 credits).

Engr 101 Introduction to Engineering I

Students are introduced to the concept of being a professional and the ethics required of a professional person through hands-on service learning projects to meet community needs, as well as reflection through journaling. Prerequisite: Math 134 (1 credit).

Engr 111 Introduction to Engineering II

This course is designed to give students the opportunity to learn how to solve engineering analysis and design problems through community focused service learning. Students will develop computational skills, sharpen communication skills, and be exposed to professional development in the form of team building, technology tools, and project management. In addition, students will have the opportunity to learn from professional engineers, scientists, and stakeholders through project-based interaction. Prerequisites: Math 154 or Engr 101 (1 credit).

Engr 133 Engineering Graphics and Computer Aided Drawing

Students will learn to construct drawing documents using AutoCAD, the use of engineering, mechanical and architectural scales, lettering practices, geometric construction (manually and AutoCAD), and the ability to visualize in three dimensions. All work requires a “hands-on” approach. Prerequisite: Math 134 (3 credits).

Engr 143 Geology for Engineers

Rock forming processes and identification, mass wasting, ground water, streams, and appropriate geological engineering technologies through project based and hand-on learning. Emphasis is given to engineering significance of processes and their resulting deposits in the study of geological processes acting on the earth’s surface. Prerequisite: Math 134 (3 credits).

Engr 141 Geology for Engineers Lab

Rock forming processes and identification, mass wasting, ground water, streams, and appropriate geological engineering technologies through project based and hand-on learning. Emphasis is given to engineering significance of processes and their resulting deposits in the study of geological processes acting on the earth’s surface. Corequisite with Engr 143. Prerequisite: Math 134 (1 credit).

Engr 202 Construction Materials

Principles that govern physical and mechanical properties of ferrous and nonferrous metals, plastics, bituminous materials, portland cement, aggregates, concrete, and timber. Laboratory exercises to demonstrate basic principles and standard laboratory tests (ASTM Standards) of structural materials. Computer-aided graphics and word processing are required for lab reports. Prerequisites: Chem 233, MIS 113 (2 credits).

Engr 201 Construction Materials Lab

Basic structure of materials and their effects on material properties. Laboratory tests on materials (ASTM Standards) to demonstrate basic principles of structural materials. Corequisite: Engr 202
Prerequisite: Chem 231 (1 credit).

Engr 213 Elementary Surveying

Care and operation of instruments, concepts of horizontal and vertical control; measurement of horizontal distances, vertical angles and elevation differences, basic surveying computations and field practice. Coverage includes the definition and analysis of errors of measurement. Additional topics include: horizontal curves, traverse work and construction surveying. The course includes an introduction to the concepts and applications of GPS and GIS to surveying practice. Corequisite course: Engr 201. Prerequisites: Math 163, MIS 113 (3 credits).

Engr 211 Elementary Surveying Lab

Laboratory portion of Engr 213. Care and operation of instruments, concepts of horizontal and vertical control; measurement of horizontal distances, vertical angles and elevation differences, basic surveying computations and field practice. Coverage includes the definition and analysis of errors of measurement. Additional topics include: horizontal curves, traverse work and construction surveying. The course includes an introduction to the concepts and applications of GPS and GIS to surveying practice. Corequisite course: Engr 213. Prerequisites: Math 163, MIS 113 (1 credit).

Engr 223 Principals of Environmental Science

Introduction to the basic principles of environmental management, environmental science and engineering. The course will teach the fundamental physical, biological, and chemical principles of environmental processes. The course will also explore the impact of humans and human activity on ecosystems in the environment. This course is co-listed with NSci 323. Prerequisites: Chem 233 (3 credits).

Engr 243 Statics

The study of the effects of external forces acting on stationary rigid bodies in equilibrium. Vector algebra is used to study two and three-dimensional systems of forces. Trusses, frames and machines, shear and moment in beams, friction, centroids, moments of inertia, and mass moments of inertia are discussed. Prerequisites: Math 194 (3 credits).

Engr 253 Mechanics of Materials

Basic concepts of stress and strain that result from axial, transverse, and torsional loads on bodies loaded within the elastic range. Shear and moment equations and diagrams, combined stresses, Mohr's circle; beam deflections; and column action and equations. Prerequisites: Engr 243 (3 credits).

Geol 143 Physical Geology

Rock forming processes and identification, mass wasting, ground water, streams, and appropriate geological engineering technologies through project based and hand-on learning. Emphasis is given to engineering significance of processes and their resulting deposits in the study of geological processes acting on the earth's surface. This course is co-listed as Engr 143 (3 credits).

Geol 153 Historical Geology

This course involves a survey of the geological history of planet Earth with special emphasis on the northern Great Plains. Topics will include the rock cycle, stratigraphy, plate tectonics, evolution, and the fossil and archeological records. Typically includes at least one field trip (3 credits).

Geol 213 Soils I

Introductory course in which students learn the basic structure, formation, and classification of soils, physical and biological properties, management aspects including water, fertility, and erosion, and the role of soils in the environment (3 credits).

Geol 303 Soils II

Course Description: This course focuses on the description, classification, and mapping of soils in western South Dakota and the Pine Ridge Reservation. Content includes field description and identification of soils and paleosols from the Cenozoic rock record (3 credits).

GIS 213 Introduction to GIS

Geographic Information Systems (GIS) are essential to the solution of many types of management, planning, environmental, and applied research problems. This course is designed to provide dedicated students, instructors/tribal members or teachers with a basic understanding of current mapping technology through introducing students to principles and the application of geographic information systems, with emphasis on GIS analysis techniques. Prerequisites: Math 134 and MIS 113 (3 credits).

GIS 313 Applications of GIS

Geographic Information Systems (GIS) are essential to the solution of many types of management, planning, environmental, and applied research problems. This course is designed to provide dedicated students, instructors/tribal members or teachers with a basic understanding of raster manipulation, editing, and geodatabases using ArcGIS. Prerequisites: GIS 213 (3 credits).

GIS 323 Remote Sensing

This challenging course rewards the student with an insight on classification methods of multi-spectral data. Students will study current remote sensing systems, focusing in on the digital image processing techniques utilized to analyze data collected by these systems. This course summarizes the physical background of earth's radiation interaction and provides detailed step-by-step instructions for using satellites in earth resources applications. Lectures will review the specific airborne and spaceborne systems, while lab assignments will cover the digital manipulation and analysis techniques employed by today's remote sensing technicians (3 credits).

IT 103 Theory of Computational Devices

This is a survey course of today's personal computers, networks, data, and other new technologies. Some of the topics covered include algorithms, operating systems, data storage and manipulation, networking and the Internet, software engineering and artificial intelligence (3 credits).

IT 134 A+ Certification

This course will prepare you to pass the A+ certification exams as required to become a computer service technician. You are prepared for the A+ exam in areas like assembly and dis-assembly of PCs, diagnosing and troubleshooting, basic networking, Windows and DOS. Prerequisite: IT 103 Theory of Computational Devices (4 credits).

IT 153 Survey of Operating Systems

You will explore the differences between popular operating systems offered in today's marketplace. Operating Systems include, but not limited to Windows and UNIX. Prerequisite: IT 103 Theory of Computational Devices (3 credits).

IT 203 Programming

You will be exposed to the fundamental concepts of problem solving and developing program logic using tools and techniques of programming. Topics include algorithm development, diagramming and program documentation and incorporating a programming language for hands-on application of programming concepts. C++ will be from UNIX. Prerequisite: IT 103 Theory of Computational Devices, Math 154 College Algebra (3 credits).

IT 224 PC Design and Assembly

Participants will be able to identify essential components of a typical PC system and how they interact with each other. By the end of the semester, participants will be able to construct a working PC system complete with operating system. Prerequisite: IT 134 A+ Certification (4 credits).

IT 243 Introduction to Networks

Physical and logical network topologies; transmission media and network access will be examined. Hardware and software network configurations, operations and requirements will be discussed. Topics include communication codes, transmission media, encoding methods, the OSI model, network standards and protocols. Copyright issues and ethics involved with computer operations will be discussed
Prerequisites: IT 153 Survey of Operating Systems (3 credits).

IT 253 Supporting Workstations

Focuses on the skills necessary to install and manage a GUI workstation environment. The basic areas you will cover include installation and configuration, architectural overview, user interface, memory management, file I/O, network administration, communications and printing, disk utilities, troubleshooting, and multimedia. Linux and Windows XX systems will be used. Prerequisite: IT 134 A+ Certification (3 credits).

IT 273 Information Systems Management

A study of the Systems Development Life Cycle including problem investigation, determination of systems requirements, selection of solutions, feasibility studies, cost projections and proposal writing for existing or new systems. Prerequisite: SCI 113 Technical Writing or Engl 103 Freshman English I (3 credits).

IT 290a, IT 290b Internship in Information Technology

This course will be offered each semester. It is designed to introduce you to the rigors of being an Information Technology professional. You are expected to work 40 hours during the semester for each hour of credit. Prerequisite: Freshman or Sophomore Status (1 credit --up to 2 credits can be earned per semester).

IT 303 Introduction to UNIX

You will be given an introduction to UNIX operating system with specific reference to UNIX commands, the Unix file structure, editors, and shell programming. Includes an introduction to system administration and security. Prerequisite: IT 153 Survey of Operating Systems (3 credits).

IT 313 Unix Shell Programming

UNIX is a versatile multi-user, multitasking operating system. UNIX has a structural software tool design philosophy that is essential for producing reliable, maintainable, and portable programs. You will cover the essential aspects of UNIX Shell programming such as the Bourne shell and shell scripts. In this class you will learn to manage UNIX files and directories using the UNIX shell commands, work with shell variables, metacharacters and regular expressions, use shell commands to redirect input, output and error messages, and archive files in the background and write different types of shell scripts. Prerequisite: IT 153 (3 credits).

IT 323 Command Line Interface

Command line concepts and syntax to perform directory hierarchy maintenance, I/O redirection, pipes, and device and system maintenance using variables and switches are topics of the command line interface course. The Disk Operating System (DOS) and UNIX dialects will be studied.

Prerequisite: IT 153 Survey of Operating Systems (3 credits).

IT 333 Network Administration

This course will acquaint you to a network environment and to provide basic entry-level skills in network administration. Hands-on exercises will allow you to become familiar with popular network operating systems management utilities including printing services, storage devices and setup of networking protocols. Prerequisite: IT 243 and IT 253 (3 credits).

IT 343 Application Software TnT

This course will help you to develop problem-solving tactics to help end users overcome difficulties with their application program. Training aspects and how you can take a proactive approach for training end users on application programs will be investigated. Prerequisite: SCI 113 and IT 253 (3 credits).

IT 353 Internet Technologies

This course is aimed at giving you a comprehensive overview of Internet technologies. You will learn about the history of the Internet, how to use a wide array of Internet technologies, Internet trends and current issues relating to the Internet. Students will also learn the key skills required to create attractive, well-designed, secure WEB sites that meet the goals of a business organization. Prerequisite: IT 253 (3 credits).

IT 363 Implementing and Administrating Web Servers

In this course you will learn the fundamentals of designing, installing, configuring, maintaining and upgrading your web site. Protocols presented include HTTP, HTTPS, FTP and SSH. Concepts covered include the use of indexed pages, directory hierarchy, SSL Certificates, SSI designs (ASP, CGI, JSP, PHP) and Streaming Media. Management of server logs, users and groups as they pertain to Web Servers will also be covered. Prerequisite: IT 243 (3 credits).

IT 373 Web Design Fundamentals

This course will explore aspects of the design and creation of web sites including the initial planning, design, implementation and publishing. With an emphasis on design, we will use web design tools such as HTML, Dreamweaver, Fireworks, and Photoshop Elements for the web will be covered. Copyright issues will also be covered. Students will design and publish a personal web page as part of the course. There will be a course web site with relevant URLs for that day's topic. Prerequisites: IT 243 and IT 323 (3 credits).

IT 383 Current Topics in Information Technology

Offers current topics from the area of Information Technology systems. Prerequisite: Junior status (3 credits).

IT 402 Certification Cram Session in Current Technologies Test #1

This class will help you study for certifications in current technology. These include but not limited to: operating systems, networking technologies, application software and communication technologies (2 credits).

IT 404 Network Protocols

Focuses on TCP/IP using Microsoft Windows NT and UNIX. Topics include UNIX and Microsoft TCP/IP addressing, subnet addressing, implementing IP routing, dynamic host configuration protocol, IP, IPX/SPX, ATM address resolution, Net BIOS name resolution, Windows Internet name service, host name resolution, connectivity, and troubleshooting. Prerequisites: IT 243 and IT 323 (4 credits).

IT 412 Certification Cram Session in Current Technologies Test #2

This class will help you study for certifications in current technology. These include but not limited to: operating systems, networking technologies, application software and communication technologies. Prerequisite: Senior status (2 credits).

IT 422 Certification Cram Session in Current Technologies Test #3

This class will help you study for certifications in current technology. These include but not limited to: operating systems, networking technologies, application software and communication technologies. Prerequisite: Senior status (2 credits).

IT 423 Supporting Network Operating Systems

Advanced network commands and utilities will be demonstrated to you to further supplement the skills required by a network administrator. Directory structures, security, printing and network administration will be covered. Troubleshooting methods and procedures will be discussed for workstations, servers and related hardware, and printing systems. Hardware and software to aid with problem identification and resolution will be discussed and demonstrated where possible. Network optimization and disaster recovery will be covered as well as copyright issues and ethics involved with computer operations.

Prerequisites: IT 153, IT 253, IT 333 (3 credits).

IT 432 Certification Cram Session in Current Technologies Test #4

This class will help you study for certifications in current technology. These include but not limited to: operating systems, networking technologies, application software and communication technologies.

Prerequisite: Senior status (2 credits).

IT 442 Certification Cram Session in Current Technologies Test #5

This class will help you study for certifications in current technology. These include but not limited to: operating systems, networking technologies, application software and communication technologies.

Prerequisite: Senior status (2 credits).

IT 443 Advanced UNIX

This course is for users interested in becoming UNIX administrators. In this course we will identify the hardware requirements for a UNIX system, the features of job control, the guidelines for managing disk space usage, the benefits of networking, the features of Transmission Control Protocol/Internet Protocol (TCP/IP), the requirements for remote access, the features of Network Information Services (NIS) and the features of Lightweight Directory Access Protocol (LDAP). Prerequisite: IT 303 (3 credits).

IT 453 Network Security

Provides you with the essential concepts and methods for the network security. Topics covered include physical/logical security and different methods of implementation, data encryption/decryption. There will be discussions of commercial and open source products for firewall, proxy, cache and NAT. Prerequisite: IT 323, IT 333, IT 404. May be taken concurrent with IT 474 (3 credits).

IT 474 Network Analysis

Provides you with the theory and methodologies for designing and analyzing network systems. Topics that you will cover include techniques used by computer professionals to determine, document, and analyze the network requirements; assessing the hardware/software needs of an organization. Emphasis will be on problem solving and cost-analysis in a networking environment. Prerequisite: IT 323, IT 333, IT 404. May be taken concurrent with IT 453 (4 credits).

IT 490a, IT 490b Internship in Information Technology

This course will be offered each semester. It is designed to introduce you to the rigors of being an Information Technology professional. You are expected to work 40 hours during the semester for each hour of credit. 1 credit hr. -up to 2 credits can be earned per semester. Prerequisite: Junior/Senior Status

IT 494 Capstone Project

This Capstone Project course develops an integrated understanding of the student's overall program. It project focuses on the best practices and techniques in Management Information Systems and Security. As a major part of the Capstone course, students will be responsible for completing a Capstone project. This project must be submitted to the Program Chair for approval prior to beginning the project. Prerequisite: Senior status (4 credits).

MIS 113 Applied Information Processing

An applied course designed to meet the needs of today's college students across the disciplines. Topics include, but are not limited to: computers based training techniques and on-line testing, E-mails and attachments, on-line conferences, delimited web-based research techniques, software applications, e-slides and web page presentation/publishing tools, and report writing documentation (3 credits).

MIS 413 Systems Analysis and Design

This course will provide the student acceptable approaches to system analysis, design and implementation. Students will begin with systems analysis, determining system requirements, evaluating systems and designing and implement a system.3 Credit Hours Prerequisite: IT 273 Business Information Systems Mgmt .

Math 103 Elementary Algebra

This course prepares students for Intermediate Algebra. Topics covered include the Real number system, solving linear equations, formulas, graphing, exponents and polynomials. Prerequisite: An acceptable score on the math placement examination or a grade of “pass” in Math 093 (3 credits).

Math 123 Introduction to Statistics

Topics include samples and populations, distributions, descriptive statistics, probability and statistical inference, experimental design, correlation and linear regression, and questionnaire methods. A lab portion of the course will introduce students to the use of computer-based statistical programs to solve problems in elementary statistics. Prerequisite: Math 134 completed with a grade of “C” or better (4 credits).

Math 134 Intermediate Algebra

This course prepares the student for College Algebra. Topics covered in this course are the basic rules of algebra, properties of real numbers, order and absolute value, integer exponents, radicals and rational exponents, polynomials and special products, factoring, the graphs of lines on the Cartesian plane and fractional expressions. Prerequisite: Math 103 with a grade of “C” or better, or an acceptable score on the mathematics placement examination (4 credits).

Math 154 College Algebra

Topics include functions and their graphs, including polynomial and rational functions, exponential and logarithmic functions. Absolute value equations and inequalities; compounds inequalities; complex numbers; systems of second degree equations and inequalities; conic sections; matrices and determinants as well as mathematical induction and the Binomial Theorem are included. Prerequisite: Math 134 with a grade of “C” or better, or an acceptable score on the mathematics placement examination (4 credits).

Math 163 Trigonometry

Topics include trigonometric functions of real numbers and their graphs; inverse trigonometric functions; solutions of triangles and applications thereof; trigonometric identities and equations; polar coordinate system, graphing in polar coordinates, complex numbers and DeMoivre’s Theorem. Prerequisite: Math 154 with a grade of “C” or better, or an acceptable score on the mathematics placement examination. Math 154 may be taken concurrently with permission of instructor (3 credits).

Math 194 Calculus I

A study of plane analytic geometry, limits, derivatives of algebraic and elementary transcendental functions, differentiation, anti-differentiation, and integration of algebraic and trigonometric functions with applications in each area. Prerequisites: Math 163 completed with a grade of “C” or better, or an acceptable score on the calculus qualifying examination (4 credits).

Math 214 Calculus II

Continuation of Math 194 for transcendental functions, integration techniques, infinite series and sequences, indeterminate forms, improper integrals, parametric equations, and polar coordinates. Prerequisites: Math 194 completed with a grade of “C” or better, or an acceptable score on the calculus qualifying examination (4 credits)

Math 224 Calculus III

This is a continuation of Math 214. Study includes polar coordinates, parametric equations, vector-valued functions, functions of multiple variables, multiple integrals and line and surface integrals. Topics also covered are level curves, gradients, cylindrical and spherical coordinates. Prerequisite: Math 214, with a grade of “C” or better (4 credits).

Math 263 Discrete Structures

This course covers fundamental topics in data structures and discrete mathematics. The topics are presented in an integrated manner that provides the discrete math foundations for data structures and computing applications of discrete mathematics concepts. Topics covered include stacks, queues, linked lists, trees, algorithms for searching and sorting, finite state automata, and concepts of computability and decidability. Topics from discrete math include sets and various types of relations (functions, graphs, trees, lattices), recursion and inductive proofs, Boolean logic, relational algebra, predicate calculus, series and limits, and asymptotic behavior of searching and sorting algorithms. Programming exercises are assigned throughout the course. Prerequisite: Math 154 completed with a grade of “C” or better, IT 203 (3 credits).

Math 324 Geometry for Educators

This course is a formal approach to Euclidean Geometry involving points, lines, planes, basic constructions, polygons, circles and three-dimensional figures. Logic, reasoning, direct and indirect proofs in two-column and paragraph form will be integrated where appropriate. A methodology component is included. Prerequisite: Math 163 completed with a grade of “C” or better (4 credits)

Math 223 Mathematics for Elementary Teacher I

This course utilizes an inquiry-based approach to gain understanding of mathematical concepts at the concrete, representational and abstract levels. Topics include problem solving, sets, algebraic thinking, the study of numeration systems, fundamental operations of arithmetic (properties and algorithms), and elementary number theory. The processes of problem solving (representation, reasoning, making connections, and communication of ideas) are emphasized throughout the course. Direct connections are made between course content and the Common Core for Mathematics. *Prerequisite: Math 103 completed with a grade of “C” or better.*

3 credits

Math 233 Mathematics for Elementary Teacher II

This course utilizes an inquiry-based approach to gain understanding of mathematical concepts at the concrete, representational and abstract levels. Topics include the extended number system (integers and rational numbers), proportional reasoning, and probability and statistics. Problem solving, representation, reasoning, making connections, and communication of ideas are emphasized throughout the course. Direct connections are made between course content and the Common Core Standards for Mathematics. Completion of Math 223 is recommended prior to taking this course. *Prerequisite: Math 103 completed with a grade of “C” or better.*

3 credits

Math 243 Mathematics for Elementary Teacher III

This course utilizes an inquiry-based approach to gain understanding of mathematical concepts at the concrete, representational and abstract levels. Topics include properties of geometric shapes, transformational geometry, coordinate geometry, and geometry as measurement. Problem solving, representation, reasoning, making connections, and communication of ideas are emphasized throughout the course. Direct connections are made between course content and the Common Core Standards for Mathematics. Completion of Math 233 is recommended prior to taking this course. *Prerequisite: Math 103 completed with a grade of "C" or better.*

3 credits

Math 343 Matrix Theory and Linear Algebra

This course covers matrix algebra, systems of linear equations, determinants, vector algebra and geometry in Euclidean 3-space, eigenvalues, eigenvectors, vector spaces, subspaces, bases and dimension, linear transformations, representation by matrices, nullity, rank, and isomorphism. *Prerequisite: Math 214 with a grade of "C" or better (3 credits).*

Math 483 Multivariate Statistics

This computer-assisted course explores the theory and application of multivariate statistical techniques including but not limited to discriminate analysis, principle components analysis, cluster analysis, and multivariate analysis of variance. It is helpful, but not required to be engaged in research that has yielded data requiring statistical analysis (3 credits).

NaRs 113 Watershed Principles

This course covers watershed processes, characteristics and measurements, land use practices for proper watershed management; analysis techniques. Hydroponic cycle and components, ownership and value of water, organizations of water managers, water quality and quantity concepts relating to range, forests, agriculture, mining and other land uses, data sources and analysis for decision making, conservation methods, and careers (3 credits).

NaRs 323 Natural Resource Measurements

Basic vocabulary, concepts, tools, procedures and report forms for measuring natural resources. Emphasis is on concepts of sampling, degree of accuracy and on interpretation of data collected (3 credits).

NSci 253 Hydrology

This course introduces the hydrologic cycle and focuses on precipitation and surface flow. The following topics will be covered and quantitative techniques applied to: precipitation, including causes, duration and measurement; infiltration and soil-water processes; evapotranspiration; surface runoff; and flow systems, including rivers, channels and impoundments. Basic concepts in fluid mechanics such as pressure, friction and pressure head will also be addressed. *Prerequisites: Math 154, Geol 143, completed with a grade of "C" or better (3 credits).*

NSci 303 Integrated Environmental Science

This course will cover an interdisciplinary approach to the study of environmental sciences. The Western science of ecology and earth sciences, traditional Lakota and other indigenous knowledge and perspectives are examined. These topics are presented with consideration of the social, economic and political aspects of environmental issue (3 credits).

NSci 323 Principals of Environmental Science

This course is an introduction to the basic principles of environmental management, environmental science and engineering. The course will teach the fundamental physical, biological, and chemical principles of environmental processes. The course will also explore the impact of humans and human activity on ecosystems in the environment. This course is co-listed with Engr 223. Prerequisites: Chem 233 (3 credits).

NSci 363 Fluvial Morphology

Fluvial processes incorporate information about river mechanics, geomorphology, hydraulics, and sedimentation into classification system that is based on the morphological characteristics of rivers. Classification of river systems gives insights into sustainable watershed use and channel stability. The Rosgen Stream Classification System is a widely used method to evaluate stream potential, and to identify departures from stream potential. Through monitoring the potential of a stream, environmental scientists can sustainably manage watersheds, evaluate the effectiveness of river improvement projects, and assess changes in river condition (3 credits).

NSci 373 Watershed Assessment Techniques

Running water habitats are rich and complex environments for biological study. Understanding how these lotic ecosystems function requires an interdisciplinary approach, incorporating hydrology, water chemistry, environmental engineering, and biology. This course will discuss habitat, life in running waters, energy and nutrients, community patterns, and biodiversity. The focus of the class will be on fieldwork to apply these concepts through recording and analyzing field data from reservation streams (3 credits).

NSci 393 Research Methods

This course introduces students to the fundamental practices of research, including, the scientific method, research design, sampling, data analysis and interpretation, manuscript preparation, and professional presentation. Participation in a closely mentored research project is preferred: may be taken concurrently with NSci 493 (3 credits).

NSci 463 Groundwater

This course involves a study of subsurface water quality and water flow. Topics will include migration of water through the vadose zone, soil moisture, ground water recharge, flow through aquifers, methods of measuring flow direction and velocity. Chemical interaction between the ground water aquifer and ground water will be discussed, along with the factors effecting the rate of contaminate migration in ground water and soils. A laboratory portion of the class may include the use of the Geoprobe® to drill and complete monitoring wells (3 credits).

NSci 483 Paleontology

In this course students will study the history and evolution of life on Earth as preserved in the fossil records of invertebrates, vertebrates, and plants. Students will also be introduced to aspects of systematic anatomical description, paleoecology, paleoclimatology, and taphonomy. Special emphasis will be placed on Cenozoic fossil floras and faunas of western South Dakota and the Pine Ridge Reservation 3 cr.

NSci 493 Research

This course consists of supervised research with a faculty mentor. Course requirements will vary depending on the nature and stage of completion of the research. Research may consist of part of the faculty mentor's research, or an independent project. This course requires students to be internally motivated to succeed. Prerequisites: NSci 393 with a "C" or better (3 credits).

Phys 113 Survey of Physics

This course is designed to cover broad topics such as mechanics, states of matter, wave motion, electricity and magnetism. Focus will be given to development of students critical thinking skills. Students will be challenged to apply these skills to conceptual type situations as well as problems that require a fundamental knowledge of college level algebra. Prerequisites: Math 163 completed with a grade of “C” or better (3 credits).

Phys 214 Physics I

The basic physics principles of Newton’s laws of motion and the conservation laws concerning momentum, energy and angular momentum are applied to the linear and curvilinear motion of particles, simple harmonic motion and the rotation of rigid bodies. An introduction to relativity and quantum concepts will also be included. Prerequisites: Phys 113 completed with a “C” or better or an acceptable score on Physics I qualifying examination and prior/concurrent registration in Math 214 (4 credits).

Phys 223 Physics II

This is a continuation of the basic physical principles covered in Physics I, which extends to magnetic fields, and electric fields. Charged particles and electrical current are covered as well as basic DC and AC circuits. Gaussian surfaces, resistance, capacitance, & magnetic induction are studied. Extensive calculus is used. Prereq.: Phys 214, completed with a grade of “C” or better, & registration in Math 224 (3 credits).

Phys 221 Physics II Laboratory

This course is a hands on introduction to physical phenomena. Experiments will be performed in kinematics, force, free fall, projectile motion, friction, rotational motion, electrostatics and magnetic fields, simple ac/dc circuits, and optics. The experiments supplement the work in Phys 214, and Phys 223. Prerequisites: Physics 223 is to be taken concurrently (1 credit).

Phys 324 Physics II for Educators

This is a continuation of the basic physical principles covered in Physics I for Educators, which extends to magnetic fields, electric fields, light, and optics. A methodology component is included. Extensive calculus is used. Prerequisite: Phys 214, completed with a grade of “C” or better, and at least concurrent registration in Math 224, or permission of instructor (4 credits).

Phys 321 Physics II for Educators Lab

This course is a hands-on introduction to physical phenomena. Experiments will be performed in kinematics, force, free fall, projectile motion, friction, rotational motion, electrostatics and magnetic fields, simple ac/dc circuits, and optics. The experiments supplement the work in Phys 214 and Phys 323. Prerequisites: Physics 324 is to be taken concurrently (1 credit)

Rang 103 Botany of the Northern Plains

This course is a systematic study of plants, including their anatomy, classification, and nomenclature, with special emphasis on species native to the northern Great Plains and the Pine Ridge Reservation (3 credits).

Sci 113 Technical Writing and Communications

This class will cover the essentials of writing clear, concise proposals, reports, technical manuals, letters, memos, bid specifications, websites and other Information Technology documents. The student will also learn how to conduct a professional presentation. This course does not satisfy the Engl 113 requirement for non-Science, Math and Technology programs. Prerequisites: Engl 103 Freshman English I (3 credits).

Sci 204 Integrated Science for Elementary Teacher I

This course is designed to acquaint the pre-service elementary teacher with the scientific method and basic processes and concepts of science through the use of published articles in addition to the text. The latest scientific discoveries and current thinking in science education will be discussed. A writing component will consist of reacting to the assigned articles. A completed science fair project is required.

Pre-requisites: Math 103, Bio 113

4 credits

Sci 214 Integrated Science for the Elementary Teacher II

This course is a continuation of Sci 204 and will further stress the scientific method and basic processes of science through the study of specific concepts of physical and biological sciences. A writing component will consist of reacting to recent scientific and science education articles followed by class discussion. The display of a science fair project is required. *Pre-requisites: Math 103, Bio 113*

4 credits

Sci 273 Scientific Literature and Writing

This course will have two foci: 1) reading and interpreting current scientific literature selected from a cross section of mainstream journals, and (2) presentation, written and orally, of research results in accepted scientific style. Research data will be either original student work or supplied by the instructor. Students will write one technical manuscript suitable for submission to a refereed journal (3 credits).

Sci 393 Special Topics

This course consists of a seminar in selected topics in science. Topics vary from semester to semester to take advantage of the special expertise of a visiting scientist, or as an opportunity to train students to meet special or pressing needs of the reservation community. This course may be taken twice as Sci 393 and Sci 493. The 300-level prefix indicates junior-level work is expected (3 credits).

Sci 493 Special Topics

This course consists of a seminar in selected topics in science. Topics vary from semester to semester to take advantage of the special expertise of a visiting scientist, or as an opportunity to train students to meet special or pressing needs of the reservation community. This course may be taken twice as Sci 393 and Sci 493. The 400-level prefix indicates senior-level work is expected (3 credits).

