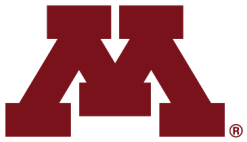

UNIVERSITY OF MINNESOTA
Driven to Discover℠

University of Minnesota Crookston
2019-21 Undergraduate Courses

This document serves as an official historical record for a specific period in time. The information found is subject to change without notice. Colleges and departments make changes to their degree requirements and course descriptions frequently. More information is available at catalogs.umn.edu.

For current information, refer to:

- Program search: z.umn.edu/publicprogramsearch
- Course search: z.umn.edu/publiccoursecatalog
- University policies: policy.umn.edu

University of Minnesota Crookston
2900 University Ave., Crookston, MN 56716
800-862-6466 | 218-281-6510 | umcinfo@umn.edu

Accounting (ACCT)

ACCT 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Current topics not covered in regularly offered courses. prereq: Instructor consent

ACCT 2010. Financial Accounting. (; 3 cr. ; Student Option; Every Fall)
Introduction to financial accounting for US organizations, reading/understanding financial statements.

ACCT 2101. Principles of Accounting I. (; 3 cr. ; Student Option; Every Fall & Spring)
Concepts of accounting cycle, cash, accounts receivable, inventories, plant assets, payroll. prereq: Math 1031

ACCT 2102. Principles of Accounting II. (; 3 cr. ; Student Option; Every Fall & Spring)
Modern accounting concepts. Cash flow statement. Analysis of financial statements. Management accounting topics, including cost-volume-profit analysis, and costing methods. prereq: 2101

ACCT 3010. Managerial Accounting. (; 3 cr. ; Student Option; Every Spring)
Costing techniques, including activity based costing, applying costing methods to determine costs of products, services, production processes. Use of costs in operating/strategic decisions. prereq: 2010 or 2101

ACCT 3201. Intermediate Accounting I. (; 4 cr. ; Student Option; Every Fall)
Financial statements, time value of money, current/long-term assets, intangible assets. prereq: 2102

ACCT 3202. Intermediate Accounting II. (; 4 cr. ; Student Option; Every Spring)
Current/long-term liabilities, stockholders' equity, statement of cash flows. Complex financial accounting topics, including leases, pensions, reporting issues. prereq: 3201

ACCT 3220. Accounting Systems. (; 3 cr. ; Student Option; Fall Even Year)
Theory and methodology of analyzing, designing, and implementing accounting information systems. Emphasizes integrated data processing and managerial aspects of systems design and learning Quickbooks Accounting Software. prereq: 2010 or 2101

ACCT 3301. Cost Accounting I. (; 3 cr. ; Student Option; Fall Even Year)
Fundamentals of cost accounting information systems, including cost-volume-profit relationships, costing in service/manufacturing sectors, cost behavior, budget/variance analysis. prereq: 2102, composition requirement

ACCT 3302. Cost Accounting II. (; 3 cr. ; Student Option; Spring Odd Year)
Refinements of cost accounting information systems, including management control systems, cost allocation refinements, capital budgeting, performance measurement. prereq: 3301

ACCT 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topic related to student's major but not covered in regularly offered courses. prereq: Jr, instructor consent

ACCT 3900. Internship. (; 1-12 cr. ; Student Option; Every Fall, Spring & Summer)
Internship in accounting. prereq: 3202

ACCT 4110. Advanced Accounting I. (; 3 cr. ; Student Option; Fall Odd Year)
Accounting for business combinations including merger, consolidation and stock acquisition. Consolidated financial statements. prereq: 3202

ACCT 4111. Advanced Accounting II. (; 3 cr. ; Student Option; Spring Even Year)
Accounting for partnership, state/local government, not-for profit. Foreign currency transactions and operations. prereq: 4110

ACCT 4221. Auditing I. (; 3 cr. ; Student Option; Fall Even Year)
Duties/responsibilities of auditor. Audit programs. Liability/professional ethics. Audit reporting standards for independent CPA. prereq: 3202

ACCT 4310. Auditing II. (; 3 cr. ; Student Option; Spring Odd Year)
Auditor's responsibility/liability, ethics, standards of professional conduct, auditing electronic data systems, applying statistical audit techniques. prereq: 4221

ACCT 4404. Income Tax I. (; 3 cr. ; Student Option; Fall Odd Year)
Income tax laws as they relate to individuals.

ACCT 4405. Income Tax II. (; 3 cr. ; Student Option; Spring Even Year)
Income tax as it affects corporations partnerships, estates, trusts. May include service-learning component. prereq: 4404

ACCT 4420. Income Tax Preparation. (; 3 cr. [max 6 cr.] ; Student Option; Every Spring)
Preparation for Registered Tax Return Preparer competency test. Prepare tax returns under Volunteer Income Tax Assistance program sponsored by Internal Revenue Service and/or preparing simulated individual/business tax returns. prereq: 4404

ACCT 4500. Forensic Accounting. (; 3 cr. ; Student Option; Fall Odd Year)
Course offered online only. Case studies of accounting fraud, tools to detect fraud, design of accounting systems to reduce fraud. prereq: 3202

ACCT 4511. CPA Review Course--Regulation. (; 3 cr. ; Student Option; Periodic Fall, Spring & Summer)
Prepares students for Regulation section of CPA exam. prereq: 4405

ACCT 4512. CPA Review Course--Financial Reporting and Accounting. (; 3 cr. ; Student Option; Periodic Fall, Spring & Summer)
Prepares students to sit for Financial Reporting/Accounting section of CPA exam. prereq: 4111

ACCT 4513. CPA Review Course--Auditing and Attestation. (; 3 cr. ; Student Option; Periodic Fall, Spring & Summer)
Prepares students to sit for Auditing/Attestation section of CPA exam. prereq: 4310

ACCT 4514. CPA Review Course--Business Environment and Concepts. (; 3 cr. ; Student Option; Periodic Fall, Spring & Summer)
Prepares students for Business Environment/Concepts section of CPA exam. prereq: 3322

Aerospace Studies (AS)

AS 1100. Air Force ROTC Fitness (NDSU/UND). (1 cr. [max 8 cr.] ; Student Option; Every Fall & Spring)
Benefits of being physically fit, participation in lifetime fitness programs. Achieving/maintaining Air Force and AFROTC fitness standards. Graded version of Enhanced Physical Fitness Training Program.

AS 1110. Heritage and Value of the United States Air Force I (NDSU/UND). (1 cr. ; A-F or Audit; Every Fall)
A survey course designed to introduce students to the United States Air Force and provides an overview of the basic characteristics, missions, and organization of the Air Force.

AS 1120. Heritage and Value of the United States Air Force II (NDSU/UND). (1 cr. ; A-F or Audit; Every Spring)
Continuation of AS 1110. A survey course designed to introduce students to the United States Air Force and provides an overview of the basic characteristics, missions, and organization of the Air Force.

AS 2100. Leadership Laboratory (NDSU/UND). (1 cr. [max 4 cr.] ; S-N only; Every Fall & Spring)
Introduction to/application of Air Force customs/courtesies, drill/ceremonies, military commands. Air Force environment. Opportunities for commissioned officers.

AS 2110. Team and Leadership Fundamentals I (NDSU/UND). (1 cr. ; Student Option; Every Fall)
Focuses on laying the foundation for teams and leadership. The topics include skills that will allow cadets to improve their leadership on a personal level and within a team. The courses will prepare cadets for their field training experience. Will instill a leadership mindset and motivate to transition from AFROTC cadet to officer candidate.

AS 2120. Team and Leadership Fundamentals II (NDSU/UND). (1 cr. ; Student Option; Every Spring)
Focuses on laying the foundation for teams and leadership. The topics include skills that will allow cadets to improve their leadership on a personal level and within a team. The courses will prepare cadets for their field training experience. Will instill a leadership mindset and motivate to transition from AFROTC cadet to officer candidate. prereq: AS 2110

AS 3210. Leading People and Effective Communication I (NDSU/UND). (3 cr. ; A-F or Audit; Every Fall)
Teaches cadets advanced skills and knowledge in management and leadership. Special emphasis is placed on enhancing leadership skills and communication. Cadets have an opportunity to try out these leadership

and management techniques in a supervised environment as juniors and seniors.

AS 3220. Leading People and Effective Communication II (NDSU/UND). (3 cr. ; A-F or Audit; Every Spring)
Teaches cadets advanced skills and knowledge in management and leadership. Special emphasis is placed on enhancing leadership skills and communication. Cadets have an opportunity to try out these leadership and management techniques in a supervised environment as juniors and seniors. prereq: 3210

AS 4100. Leadership Laboratory (NDSU/UND). (1 cr. [max 4 cr.] ; S-N only; Every Fall & Spring)
Practical development of leadership skills. Students instruct, supervise, lead junior cadets participating in 2100, perform higher-level management functions within cadet corps organization. Supervised lab.

AS 4410. National Security Affairs/Preparation for Active Duty I (NDSU/UND). (3 cr. ; A-F or Audit; Every Fall)
College seniors. Give them the foundation to understand their role as military officers in American society. Overview of complex social and political issues facing the military profession and requires a measure of sophistication commensurate with senior college level.

AS 4420. National Security Affairs/Preparation for Active Duty II (NDSU/UND). (3 cr. ; A-F or Audit; Every Spring)
College seniors. Give them the foundation to understand their role as military officers in American society. Overview of complex social and political issues facing the military profession and requires a measure of sophistication commensurate with senior college level. prereq: 4410

Agricultural Economics (AGEC)

AGEC 1004. Introduction to Agribusiness. (; 3 cr. ; Student Option; Every Fall)
Background of American agriculture. Interrelationships of agricultural industries. Economic concepts of production, marketing, and consumption. Principles of management. Agricultural policy. Issues/trends in agribusiness.

AGEC 1005. World Agricultural Food Systems. (3 cr. ; Student Option; Every Spring)
Historical preferences, consumer trends in diverse geographic regions. How global/national policies affect food trade.

AGEC 1803. Directed Studies. (; 1-3 cr. [max 18 cr.] ; Student Option; Every Fall & Spring)
Current topics not covered in regularly offered courses. prereq: instr consent

AGEC 2310. Agribusiness Financial Records. (; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Applied course in record keeping. Use of computerized system to record business transactions; manage agricultural inventories, receivables, payables, and payroll; and generate coordinated financial statements.

AGEC 2530. Professional Agriselling. (; 3 cr. ; A-F or Audit; Every Fall & Spring)
Use of technical and agricultural knowledge in agricultural sales. Need-satisfaction approach to selling. Planning and conducting informational meetings, exhibiting at farm and trade shows, importance of service and timeliness in agribusiness, and practice in making agrisales presentations.

AGEC 3050. Economics for AgriBusiness Management. (; 3 cr. ; A-F or Audit; Every Spring)
Gathering, organizing, assimilating, applying information applicable to current economic environment. Behavior of individual consumers, resource owners, business firms, market operation in a free enterprise economy. Applying basic economic principles that govern profit. Elements and effects of government policy. Real-world forecasting and planning. prereq: Econ 2101 or instructor consent

AGEC 3310. Advanced Agribusiness Financial Records. (; 3 cr. ; Student Option; Every Spring)
Students learn to prepare cash flow budgets, prepare enterprise reports for analysis, prepare and interpret Farm Financial Standards reports, and learn about the connection between production field and/or livestock records and financial records using a computer software program specific to agriculture. prereq: 2310

AGEC 3430. Food Marketing Systems. (3 cr. ; Student Option; Every Fall)
Topics include frameworks for analyzing food marketing systems. Marketing institutions, food prices, marketing costs, functional/organizational issues, role of government. Grades/standards. Issues in transportation, storage, and international trade.

AGEC 3495. Special Topics in Agribusiness. (; 1-3 cr. [max 9 cr.] ; Student Option; Periodic Fall & Spring)
Topics cover contemporary issues in agribusiness. Offered on demand.

AGEC 3540. Farm Business Management. (; 3 cr. ; A-F or Audit; Every Fall & Spring)
Principles of farm accounting. Financial/income statements, cash flow statements, depreciation methods, farm income tax, enterprise analysis, farm management decision making, budgeting/planning, computer analysis of farm business. prereq: 2310 or Acct 2102

AGEC 3640. Agricultural Finance and Valuation. (; 3 cr. ; Student Option; Every Spring)
Analysis of investment strategies and financing policies for farm and agribusiness firms. Liquidity, solvency, profitability. Financial documents, legal aspects of credit, financial intermediaries serving agriculture, property valuation, estate planning. prereq: 3540

AGEC 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instr consent.

AGEC 4460. International Marketing Problems and Practices. (; 3 cr. ; Student Option; Every Spring)
Problems/practices facing companies in international trade. Import/export regulations, exchange rates, business practices/policies.

AGEC 4740. Grain and Livestock Marketing. (; 3 cr. ; Student Option; Every Fall & Spring)
Students develop commodity marketing plan for grain or livestock farming operations. Topics include cash markets, grid pricing, grade premiums/discounts, contracting, crop/livestock insurance, and futures/options.

AGEC 4750. Agribusiness Marketing. (3 cr. ; Student Option; Periodic Fall, Spring & Summer)
Role of marketing in agribusiness. Marketing systems/strategies for competitiveness in a rapidly changing marketplace. Identifying strengths/opportunities to create competitive advantage. prereq: 2530 or instructor consent

AGEC 4760. Business Plan Development for Agribusiness. (; 3 cr. ; Student Option; Every Spring)
Capstone. Application of economic, marketing, and business principles to critically evaluate a business opportunity. Identify and assess an agribusiness opportunity. Critically evaluate the potential for the business to be successful. Students develop a comprehensive business plan. prereq: 3540, 4740, MKTG 3300

AGEC 4800. Rural Economic Development Practicum. (3 cr. ; Student Option;)
Students develop strategies/program to promote economic development for a real rural community, including implementation/financing plans.

Agricultural Education (AGED)

AGED 1001. Careers in Agricultural Education, Extension Education and Farm Business Management. (; 1 cr. ; A-F or Audit; Every Fall)
Historical development of agricultural, extension, and farm business management education. Orientation to career opportunities. Discuss foundational building blocks of agricultural education.

AGED 2001. Early Experience in Agricultural Education. (; 1 cr. [max 3 cr.] ; Student Option; Every Fall & Spring)
Observe schools, extension offices, farm business management programs, and agricultural-oriented businesses to learn about work/workplace in agricultural education.

AGED 3003. SAE (Supervised Agricultural Experience) and FFA. (3 cr. ; Student Option; Every Spring)
Principles/techniques to coordinate work-based learning. Supervised Agricultural Experience in agricultural education. Principles/techniques to advising an FFA chapter. Historical roots/philosophical basis for both experiential education and FFA integrated

into the classroom, community, families, and administration of work-placed learning and FFA.

AGED 3004. Methods of Teaching Agricultural Education. (4 cr. ; Student Option; Every Fall)
Use of teaching resources; principles of teaching/learning; problem-solving techniques, lesson plan construction for large group, small group and individual investigations; microteaching labs, assessment preparation/ administration/evaluation. prereq: 3003

AGED 4001. Methods of Teaching Farm Business Management. (1 cr. ; Student Option; Every Spring)
Teaching/learning methodology specific to Farm Business Management including essential farm management skills for classroom and individual instruction. prereq: Concurrent enrollment in a Student Teaching course (AgEd 4600, 4700, 4800, 4900)

AGED 4003. Agricultural Education Program Organization. (3 cr. ; Student Option; Every Fall)
Development of community school program in agriculture, agribusiness, natural resources, and environmental education including classroom, SAE, and FFA with community involvement/"local control" recognition. Program planning outcomes with student/ community/agribusiness needs assessed. prereq: 3003, 3004 or concurrent enrollment

AGED 4600. Student Teaching: Work-Based Learning. (1 cr. ; Student Option; Every Spring)
Student teaching experience in schools that have 9-12 work-based learning opportunities. prereq: concurrent enrollment in other AgEd internship courses

AGED 4700. Student Teaching: Farm Business Management. (1 cr. ; Student Option; Every Spring)
Student teaching experience in communities that have access to Farm Business Management. prereq: concurrent enrollment in other AgEd internship courses

AGED 4800. Student Teaching: Middle School. (1 cr. ; Student Option; Every Spring)
Student teaching experience in schools offering middle school agricultural education or in related fields such as middle school science. prereq: concurrent enrollment in other AgEd internship courses

AGED 4900. Student Teaching: High School. (8 cr. ; Student Option; Every Spring)
Student teaching experience in schools offering high school agricultural education. prereq: concurrent enrollment in other AgEd internship courses

Agricultural Systems Mgmt (ASM)

ASM 1021. Introduction to Agricultural Systems Management. (3 cr. ; Student Option; Every Fall)
Overview of agricultural mechanization systems (engines, machinery, structures, processes).

ASM 1034. Facility Maintenance and Safety. (4 cr. ; Student Option; Every Fall & Spring)
Safe operation and working environment for power equipment, structures, utilities, and metal fabrication.

ASM 1044. Computer-Aided Drafting. (3 cr. ; Student Option; Every Fall & Spring)
Sketching/dimensioning architectural/ landscape projects. Use of computer-aided drafting program to develop plan views, floor plans, elevations, pictorials, and mechanical drawings.

ASM 1333. Agricultural Building Construction. (3 cr. ; Student Option;)
Selection/application of wood, concrete, and steel building materials. Construction techniques using portable, stationary, and hand construction tools. Criteria for quality building construction.

ASM 1803. Directed Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topics in agriculture, food systems.

ASM 2043. Welding and Manufacturing Processes. (3 cr. ; Student Option; Every Fall & Spring)
Arc/gas welding of ferrous/nonferrous metals. TIG/MIG welding. Designs for welding, economics, and cost estimating. Project design/construction. Basic metal machining.

ASM 2053. Electricity, Controls, and Sensors in Agriculture. (3 cr. ; Student Option; Spring Odd Year)
Theory and practical application of electricity and electrical controls in agriculture. Selection/ maintenance of electrical motors, heating/light/ control devices, and sensors.

ASM 2200. Introduction to Renewable Energy Systems. (3 cr. ; Student Option; Every Spring)
Survey of energy needs as a nation. Changes in world energy demands. Sources of renewable energy. Employment opportunities in bio-fuels, solar, wind, and geo-thermal. Site tours, guest lectures.

ASM 2250. Agricultural Machinery Management. (3 cr. ; Student Option; Every Fall)
Mechanical principles. Application of field machinery/power units to varying crop, soil, and climatic conditions. Farm management decisions. Introduction to precision agriculture.

ASM 3002. Agricultural Mobile Power Systems. (3 cr. ; Student Option; Every Spring)
Selecting, testing, and maintaining power units for drawbar, PTO, and hydraulic applications. Spark/compression ignition systems, drive trains, DC electrical and air conditioning systems.

ASM 3005. Facilities Planning and Selection. (3 cr. ; Student Option; Spring Odd Year)
Planning facility design. Selecting materials/ equipment used in manufacturing and production operations. prereq: 1034, Math 1031

ASM 3009. Surveying. (4 cr. ; Student Option; Every Fall)
Principles, statistical methods, theory, applications. Measurement of distance, angles, directions using theodolites, electronic distance measurement, transits, total stations. Exercises in leveling, profiling, topographic mapping, traversing, land/construction surveying. Introduction to photogrammetry, GPS, GIS.

ASM 3201. Bio-Fuels Technology. (3 cr. ; Student Option; Every Spring)
Historical development of bio-fuels industry. Chemical/mechanical processes of production in ethanol, bio-diesel, and methane fuels. Economics, current legislation. Site tours, guest lectures. prereq: 2200

ASM 3202. Solar, Wind, and Geo-Thermal Systems. (3 cr. ; Student Option; Every Fall)
Historical development of solar, wind, and geo-thermal industries. Mechanical processes of design/utilization of these renewable energy sources. Economics, current legislation. Site tours, guest lectures. prereq: 2200

ASM 3360. Applications in Precision Agriculture. (3 cr. ; Student Option; Every Fall)
Introduction to applications of precision agriculture. Hands-on practice of mapping fields. Grid sampling techniques. Variable rate applications. Yield mapping/interpretation. Map information. prereq: ITM 1010, Soil 1293

ASM 3511. Yield Monitoring and Data Interpretation. (1 cr. ; A-F or Audit; Every Spring)
Calibration of commercially available yield monitoring equipment. Operation fundamentals of various yield sensors. Interfacing sensors, data loggers, global position devices. Saving, storing, retrieving, pooling yield data. Working with data from multiple vendor models/formats. Use of commercially available software to make yield map interpretation. prereq: ASM 3360

ASM 3512. Remote Sensing Applications in Precision Agriculture. (1 cr. ; Student Option; Every Spring)
Fundamentals of remote sensing and satellite imaging in monitoring/managing cropping system variability. Applications of commercial mapping and GIS software in processing/ interpreting production scale economic variables. prereq: ASM 3360

ASM 3513. Precision Farming Data. (1 cr. ; Student Option; Every Spring)
Cropping systems data in precision agriculture. On-farm input/output record keeping, profit analysis using commercial software. On-farm trials/testing of agronomic variables using precision agriculture technologies. prereq: 3360

ASM 3804. Individual Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major, not covered in regularly offered courses. prereq: Jr or instructor consent

Agronomy (AGRO)

AGRO 1020. Special Topics. (; 1-3 cr. [max 6 cr.] ; Student Option; Periodic Fall & Spring)
Identifying economically important crop/weed seeds throughout the United States.

AGRO 1030. Crop and Weed Identification. (3 cr. ; A-F or Audit; Every Fall)
Morphological characteristics used in mature plant, seedling, and seed identification. Identifying economically important crops and weeds in all stages of growth throughout the United States.

AGRO 1183. Field Crops: Production Principles. (; 3 cr. ; Student Option; Every Fall & Spring)
Principles and cultural practices used in growing certain row crops, small grains, oil crops, and specialty crops.

AGRO 1540. Seed Conditioning and Technology. (4 cr. ; Student Option; Spring Even Year)
Seed laws, certification standards, purity analysis, germination tests, vigor tests, principles of seed conditioning, handling equipment. Tours of facilities processing small grains, sunflowers, grasses, and legumes. prereq: 1030

AGRO 1803. Directed Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Current topics not covered in regularly offered courses. prereq: Instructor consent

AGRO 2573. Entomology. (3 cr. ; A-F or Audit; Every Fall)
Insect taxonomy, anatomy, and physiology. Emphasis on insects of economic importance, especially in the Upper Midwest. Control methods, including integrated pest management. prereq: Agro 1183 or Hort 1010

AGRO 2640. Applied Agriculture Chemicals. (3 cr. ; Student Option; Every Fall)
Applied use of agriculture chemicals. Safety, toxicity, efficacy, phytotoxicity, recommendations, environmental interactions. prereq: 1030

AGRO 2840. Grain and Seed Evaluation. (4 cr. ; A-F or Audit; Every Spring)
Analytical techniques, procedures, and practices in interpreting U.S. grain standards. Identifying seeds of crops, weeds, and diseases. Lab practice in grading grain according to U.S. standards and determining grain quality. prereq: 1030

AGRO 3023. Plant Breeding and Genetics. (4 cr. ; Student Option; Every Spring)
Principles of plant breeding. Emphasizes application of genetic principles to plant breeding. Genetic variation, selection methods, cultivar development. Examples from common field/horticultural crops. prereq: BIOL 1009

AGRO 3030. Research Techniques in Agriculture and Natural Resources. (3 cr. ; A-F or Audit; Every Spring)
Experimental design and methodology in agriculture and natural resources research. Basic philosophy, data interpretation and analysis, and application of research information to practical management situations. prereq: Math 1150, Jr or Sr

AGRO 3130. Forages. (3 cr. ; A-F or Audit; Every Fall)
Characteristics, distribution, preservation, and uses of forage crops for pasture, silage, hay, and soil improvement. Cultural practices, disease and insect control, seed production, forage storage. Interrelationships between animals and plants as they relate to selection, production, and utilization of forage crops.

AGRO 3230. Introduction to Plant Pathology. (3 cr. ; A-F or Audit; Every Fall)
Nature, diagnosis, and management of plant diseases. Identification, control, and life cycles of representative plant diseases significant in the Upper Midwest that illustrate plant pathology principles. prereq: Agro 1183 or Hort 1010, Biol 1009

AGRO 3441. Topics in Specialty Crop Production. (; 1 cr. [max 3 cr.] ; Student Option; Periodic Spring)
Lecture/discussion on one economically important or emerging specialty crop such as potato or sugar beet. Specific crop varies. Land selection, soil fertility, pest control, harvest, storage, quality, marketing.

AGRO 3444. Crop Production. (4 cr. ; A-F or Audit; Every Fall)
Principles, including best cultural practices for crops of particular economic importance to the region. Oilseed, small grain, and specialty crops. prereq: 1183

AGRO 3620. Advanced Identification, Seed Analysis, and Grain Grading. (3 cr. ; Student Option; Every Fall)
Advanced techniques in identification, seed analysis, and grain grading. prereq: [1030, 2840] or instructor consent

AGRO 3630. Integrated Crop Management (Capstone). (3 cr. ; A-F or Audit; Every Spring)
Capstone. Patterned after the North American Colleges and Teachers of Agriculture (NACTA) crops contest. Students will be tested in major areas of agronomy featured in NACTA contest. For each test area, students must reach a predetermined minimum score to earn a passing grade. prereq: 1030, 1540, 2640, 3030, 3230, SOIL 3414

AGRO 3640. Weed Science. (3 cr. ; Student Option; Every Spring)
Mechanical, cultural, biological, and chemical weed control practices. Factors affecting control. Classification and modes of action of herbicides, insecticides, fungicides, and plant growth regulators. prereq: [BIOL 1009, CHEM 1401, SOIL 1293] or instructor consent

AGRO 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

Animal Science (ANSC)

ANSC 1004. Introduction to Animal Science. (4 cr. ; A-F or Audit; Every Fall & Spring)
Survey of the meat animal, dairy, and equine industries. Emphasis on general management principles, health care, breeding, behavior, feeding, and care of dairy cattle, beef cattle, horses, sheep, and swine.

ANSC 1033. Introduction to Companion Animals. (3 cr. ; Student Option; Every Fall)
Companion animal industry. Emphasizes identification, general management principles, health care, breeding, behavior, feeding, and humane care of companion animals.

ANSC 1101. Animal Evaluation. (; 1 cr. [max 3 cr.] ; Student Option; Every Fall)
Conformation, breed characteristics, type, and their importance in evaluation. Techniques of evaluation and interpretation of evaluation data.

ANSC 1201. Advanced Animal Evaluation. (1 cr. [max 3 cr.] ; Student Option; Every Spring)
Advanced techniques in evaluating and selecting dairy or beef cattle, sheep, and swine. Preparing and delivering oral reasons. prereq: 1101

ANSC 1206. Sheep and Swine Production Techniques. (2 cr. ; Student Option; Every Spring)
Skills necessary for successful/economical sheep/swine production.

ANSC 1803. Directed Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Current topics not covered in regularly offered courses. prereq: Instructor consent

ANSC 2001. Artificial Insemination. (1 cr. ; Student Option;)
Anatomy/physiology, heat detection, hormone function/synchronization, semen storage/handling, AI technique, record keeping, sire selection. Practical technical skills to run AI programs.

ANSC 2104. Feeds and Feeding. (4 cr. ; Student Option; Every Fall)
Identification and use of feed grains, forages, supplemental feeds, and additives. Bushel weights, price, and cost per unit calculations. Moisture content calculations. Factors influencing feed quality, feed value, price, and storage. Digestion, ration formulation, and feed processing methods. prereq: 1004, high school chem or Chem 1001

ANSC 3004. Livestock Facilities and Environmental Systems. (3 cr. ; Student Option; Fall Even Year)
Effects of environment on animal production. Principles of environmental control. Planning open, partial, and total environmentally controlled systems for livestock. Functional, economic, and environmental considerations. Feed handling systems, waste management alternatives. prereq: Math 1031, or instructor consent

ANSC 3023. Animal Breeding. (3 cr. ; Student Option; Every Fall)
Application of qualitative genetic principles to animal breeding. Quantitative genetics. Livestock improvements through breeding/selection systems. prereq: 1004, Biol 1009

ANSC 3052. Meat and Dairy Processing. (3 cr. ; Student Option; Every Fall)

Packaging/processing dairy/meat. Effects of hygiene/sanitation on product quality. Types of spoilage. Microbial ecology within the industry.

ANSC 3104. Applied Animal Nutrition. (4 cr. ; Student Option; Every Spring)
Continuation of digestion/metabolism to include modifications/control. Application of nutritional principles to economical feeding of different farm animal species. Nutrient requirements/ modifications due to weather, stress, feeding objectives, environment, and metabolic limitations. Computer formulation of rations. prereq: 2104, [CHEM 1401 or [CHEM 3021 or concurrent enrollment in CHEM 3021]]

ANSC 3203. Animal Anatomy and Physiology. (4 cr. ; Student Option; Every Fall)
Anatomy/physiology of several species. Organization of body from cells into tissues/ organs. Identification, comparison, and contrast of different species. Growth development/ function of selected bodily systems. prereq: 1004, Biol 1009

ANSC 3204. Dairy Production. (4 cr. ; A-F or Audit; Every Fall)
Growth/development of dairy cattle. Genetics/ breeding, dairy nutrition, growth/development of heifer to first calving. Getting cows into production and their subsequent management, including milking management skills. prereq: 2104

ANSC 3205. Dairy Management Practicum. (3 cr. ; Student Option; Periodic Fall)
Management and clinical skills, including those unique to large dairy herds. prereq: Sr or instructor consent

ANSC 3303. Beef Production. (4 cr. ; Student Option; Every Fall)
Application of technology and information to systems of managing beef operations. Incorporation of economics, farm management, records, and production science in management plans. Computer applications in management. prereq: 2104

ANSC 3304. Reproduction, AI, and Lactation. (4 cr. ; Student Option; Every Spring)
Functions of reproductive organs, fertilization, the estrous cycle and its endocrine control, reproductive efficiency and problems, principles of artificial insemination. Anatomy, physiology, and biochemistry of the mammary gland; mammary growth; initiation of and maintenance of lactation. Milk synthesis and factors influencing the lactation curve. prereq: 3203

ANSC 3441. Current Topics in Animal Science. (; 1 cr. ; Student Option; Every Fall)
Focus on one economically important or emerging topic in animal science (e.g., swine, sheep, companion animal). Lecture/discussion. prereq: AnSc 1203, 2104, 3304 or concurrent enrollment in 3304

ANSC 3503. Animal Health and Disease. (3 cr. ; Student Option; Every Spring)
Concepts of health and disease with emphasis on prevention through health plans and enhancing immunity. Influence of environment and other stressors on health and disease. prereq: 3203

ANSC 3804. Individual Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

ANSC 4204. Animal Systems Management. (3 cr. [max 4 cr.] ; A-F or Audit; Every Spring)
Planning, budgeting (cash, feed, machinery, etc.), and implementing programs; facilities; labor force; and other factors required for operation of modern animal operations. Field trips, planning for existing operations. prereq: 3004, 3204 or 3303 or instructor consent

Applied Studies (APLS)

APLS 3001. Individual Program Development. (; 1 cr. ; Student Option; Every Fall & Spring)
Developing degree outcomes relevant to individual career objectives, designing an individual program of study for the Applied Studies baccalaureate degree, and setting future career goals. The course also includes topics such as APA writing format, campus and University-wide policy, and student services.

APLS 3900. Internship/Field Experience. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Supervised professional work experience in selected sites. Reports and consultation with faculty adviser and employer. prereq: 3001, adviser consent

APLS 4652. Applied Studies Seminar. (; 2 cr. [max 2.5 cr.] ; Student Option; Every Fall & Spring)
Capstone course. Students present projects demonstrating integration of fields of study, general education, work experience, and computer applications. prereq: 3001, within 1 semester of graduation, adviser consent

Art (ART)

ART 1152. Drawing and Design. (HUMANITIES; 3 cr. ; Student Option; Periodic Fall & Spring)
Introduces foundations of drawing/design. Lecture studies concepts/history of drawing/ design. Studio work is practical application.

ART 1252. Painting and Design. (HUMANITIES; 3 cr. ; Student Option; Periodic Fall & Spring)
Introduces foundations of color (painting) and design. Lecture studies concepts/history of drawing/design. Studio work is practical application.

ART 1352. Pottery Design and Techniques. (HUMANITIES; 3 cr. ; Student Option; Periodic Fall & Spring)
Introduces foundations of art techniques and design. Lecture studies concepts/history of drawing/design. Studio work is practical application.

Aviation (AVIA)

AVIA 1103. Introduction to Aviation. (4 cr. ; Student Option; Every Fall)
Preparation for FAA private pilot written exam. FAA regulations, weather, radio navigation, flight safety, emergency procedures.

AVIA 1104. Introduction to Aviation Flight Lab. (1 cr. ; Student Option; Every Fall & Spring)
Flight lab lessons leading to private pilot certificate. Flight lessons must be completed or private pilot certificate received before course credit is issued. prereq: 1103 or concurrent enrollment in 1103

AVIA 1396. Conventional Aircraft Operations. (1 cr. ; A-F or Audit; Every Fall & Spring)
Ground school, dual flight instruction for endorsement for operation of tail wheel airplanes on ground, in flight. prereq: 1103, 1104 or instructor consent

AVIA 1803. Directed Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Current topics not covered in regularly offered courses. prereq: Instructor consent

AVIA 2220. Basic Attitude Instrument Flying. (2 cr. ; Student Option; Every Fall)
Operation, interpretation, and practical use of VOR, ADF, DME, RNAV, RMI, HIS, AND GPS systems. Instrument charts required for IFR flight. prereq: 1103, 1104

AVIA 2221. Basic Attitude Instrument Flying Lab. (1 cr. ; Student Option; Every Fall & Spring)
Flight Lab associated with AVIA 2220. Flight by reference to instruments, including electronic navigation and instrument charts. prereq: 2220 or concurrent enrollment in 2220

AVIA 2222. IFR Regulations and Procedures. (2 cr. ; Student Option; Every Spring)
Regulations, procedures, publications for operating IFR in national airspace system. Terminal/en route procedures. prereq: 2220, 2221

AVIA 2223. IFR Regulations and Procedures Flight Lab. (1 cr. ; Student Option; Every Fall & Spring)
Flight lab associated with 2222. IFR flight lessons concentrating on terminal and enroute procedures. Students must complete the appropriate flight lessons to satisfactorily complete the course. prereq: 2222 or concurrent enrollment in 2222

AVIA 3320. Airplane Aerodynamics. (2 cr. ; Student Option; Every Fall)
Aerodynamics, performance, stability, control, weight/balance, special flight conditions as appropriate for commercial pilots. Commercial maneuvers, flight computers, commercial regulations. prereq: 2222, 2223

AVIA 3321. Airplane Aerodynamics Flight lab. (1 cr. ; Student Option; Every Fall & Spring)
Flight lab associated with 3320. Students train in a complex aircraft. Maneuvers/procedures required to complete FAA Commercial Pilot

certificate. At completion of course, the student is endorsed for operation of a complex aircraft and recommended to take FAA Commercial practical test. prereq: 3320 or concurrent enrollment in 3320

AVIA 3324. Aircraft Systems and Instruments. (3 cr. ; A-F or Audit; Every Spring)
Flight instruments, reciprocating engines. Propeller, electrical, environmental, hydraulic, pneumatic, fuel, ignition, lubrication, and pressurization systems. Commercial regulations, including FARS part 61, 91, 121, and 135. prereq: 1103, 1104 or instructor consent

AVIA 3355. Multiengine Systems and Procedures. (2 cr. ; A-F or Audit; Periodic Fall & Spring)
Operating light twin-engine airplanes. Pilot actions for managing normal/abnormal aircraft situations. Multiengine aircraft systems. Students must complete flight lessons. prereq: Instructor consent; offered on-demand

AVIA 3396. Advanced Conventional Aircraft Operations. (1 cr. ; A-F or Audit; Every Fall & Spring)
Ground school, dual flight instruction for advanced pilot maneuvering, flight applications of tail wheel airplanes. Students must complete flight lessons. prereq: 1396 or instructor consent

AVIA 3400. Emergency Maneuver Training. (1 cr. ; Student Option; Fall Even Year)
Introduction/exploration of high-angle of attack flight. Emphasizes recognition/recovery from unusual attitudes, control failures, and in-flight emergencies. prereq: 1103, 1104, 1396, or instructor consent

AVIA 3412. CFI Certification. (4 cr. ; Student Option; Periodic Fall & Spring)
Preparation for FAA Certified Flight Instructor written tests. Flight instructor responsibilities, teaching concerns, effective teaching methods, learning process, flight training syllabi, effective evaluations. Offered on demand. prereq: [3320, 3321, 3324] or instructor consent

AVIA 3413. CFI Certification Flight Lab. (1 cr. ; Student Option; Periodic Fall & Spring)
Flight lab lessons leading to Certified Flight Instructor Certificate. Flight lessons must be completed or certificate received before course credit is issued. prereq: 3412 or concurrent enrollment in 3412

AVIA 3415. Instrument CFI Certification. (4 cr. ; A-F or Audit; Periodic Fall & Spring)
Instrument flight instructor responsibilities and techniques. Additional study of instrument flight, ATC system, charts, publications, and rules of IFR environment as they pertain to teaching. Practical teaching experience. Students must complete the instrument rating for a flight instructor certificate. prereq: 3412, 3413; offered on demand

AVIA 3602. Natural Resources and Enforcement Applications. (2 cr. ; A-F or Audit; Spring Even Year)
Mission specific knowledge/skills in natural resources and law enforcement aviation. History/purposes, authority, operations, safety, records. Equipment and best practices for natural resources and law enforcement aviators.

AVIA 3804. Individual Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

Bachelor of Manufacturing (BM)

BM 3000. Manufacturing Processes. (; 3 cr. ; Student Option; Every Spring)
Introduces students to fundamental properties of materials including metals, polymers, ceramics and composites. Basic concepts and various aspects of manufacturing processes such as casting, rolling, forging, extrusion and drawing are covered in this course.

BM 3005. Facilities Planning and Selection. (; 3 cr. ; Student Option; Fall Odd Year)
Facilities planning through layout design. Product flow, space-activity relationships, personnel requirements, and material handling are considered, as well as receiving, shipping, warehousing, and integration with manufacturing.

BM 3006. Maintenance and Safety Management. (; 3 cr. ; Student Option; Fall Even Year)
Fundamentals of maintenance and its importance in material & energy conservation, inventory control, productivity, safety, and pollution control etc. Safety regulations, pollution problems, human reliability, total quality management, total productivity maintenance. prereq: Math 1150

BM 3007. Metrology. (; 3 cr. ; Student Option; Every Spring)
Instrument calibration, reading engineering standards, precision measurement, geometric dimensioning/tolerancing, graphical inspection analysis, measuring tools, surface plate inspection methods.

BM 3008. Sustainability and Compliance. (; 3 cr. ; Student Option; Every Fall)
Introduction to strategies used by businesses to achieve/maintain compliance with environmental laws/sustainability goals. Focus upon environmental due diligence, value of environmental auditing to identify compliance/sustainability issues in operations, and leveraging it to secure a competitive advantage in a marketplace.

BM 3012. Applied Engineering Principles. (; 3 cr. ; Student Option; Periodic Fall, Spring & Summer)
Overview of the component parts of a manufacturing system, measurements, mass balances, properties of fluids, pumps, thermodynamics, electrical systems, heating systems, steam generation, refrigeration, water and waste, materials handling, plant design, environmental issues, and safety.

BM 3020. Industrial Safety. (; 3 cr. ; A-F or Audit; Periodic Fall & Spring)
Comprehensive approach to safety problems in workplace, including OSHA standards, attitude development, safety auditing, hazard analysis. prereq: PMTC 2800 [Northwest Technical College]

BM 3025. Lean Six Sigma. (; 4 cr. ; Student Option; Periodic Fall & Spring)
Current lean six sigma philosophies, methods, and techniques relevant to manufacturing, service, quality, and productivity. DMAIC (Define, Measure, Analyze, Improve, and Control) framework, lean methodology, project management, leadership and organizational methods. prereq: Math 1150

BM 3034. Applied Quality. (; 3 cr. ; Student Option; Every Fall)
Quality management concepts and definitions to explore Statistical Process Control (SPC) to diagnose, reduce and eliminate causes of variation. Assist in process improvement, production control, production planning and decision-making. SPC for variables and attributes are explored. prereq: Math 1150

BM 3040. Industrial Simulation. (; 3 cr. ; Student Option; Every Fall)
Use of discrete-event simulation for analyzing complex systems. Selecting proper probability distribution to model simulation inputs, verification and validation of simulation models, and statistical analysis of simulation output.

BM 3053. Product Development Management. (; 3 cr. ; Student Option; Every Spring)
Learn about modern tools and methods for product design and development. The cornerstone is a project in which the students conceive, design, and prototype a physical product.

BM 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; A-F or Audit; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

BM 3900. Internship. (; 1-3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Supervised professional work experience in manufacturing plant situations. Reports/ consultations with faculty advisers/employers. prereq: Jr

Biology (BIOL)

BIOL 1000. Biology and Society. (BIOL SCI,PEOPLE/ENV; 4 cr. ; Student Option; Every Fall, Spring & Summer)
Introductory course that explores how scientific concepts may impact an individual's daily life. Topics: how energy is transformed/transported; role of photosynthesis and respiration in global climate change; genetic inheritance; evolution by natural selection; role of environmental factors in shaping global societal development, and sustainability. Lab. prereq: High School science courses

BIOL 1009. General Biology. (BIOL SCI,PEOPLE/ENV; 4 cr. ; Student Option; Every Fall & Spring)

Major concepts of modern biology. Molecular structure of living things. Energy recruitment/ utilization. Flow of genetic information through organisms/populations. Principles of inheritance, ecology, and evolution. Lab. prereq: High school science courses

BIOL 1009H. Honors: General Biology. (BIOL SCI,PEOPLE/ENV; 4 cr. ; Student Option; Every Fall & Spring)
Quantitative methods used to emphasize the dynamic nature of biology. Modern biology. Molecular structure of living things, energy recruitment/utilization, flow of genetic information through organisms/populations. Principles of inheritance, ecology, and evolution. Includes lab. prereq: High school chemistry or consent of instructor

BIOL 1803. Directed Studies for the Biological Sciences. (1-3 cr. [max 12 cr.] ; Student Option; Every Fall, Spring & Summer)
Participation in research for talented undergraduates with fewer than 30 credits. prereq: Instructor permission

BIOL 1805. Nature of Life. (2 cr. ; Student Option; Every Fall)
Introduction to biology program, faculty, coursework, and expectations. Mandatory camping trip to Itasca State Park. prereq: Biology major

BIOL 2012. General Zoology. (4 cr. ; Student Option; Every Spring)
Major animal groups (phyla). Applications of morphological, physiological, and developmental characteristics to define evolutionary relationships. Parasitic forms affecting human welfare. Lab requires dissection, including mammals. prereq: 1009

BIOL 2020. Plant Anatomy and Physiology. (BIOL SCI,PEOPLE/ENV; 3 cr. ; Student Option; Every Spring)
Overview of plant anatomy and physiology with particular attention paid to angiosperms and their basic structure and function. prereq: 1009

BIOL 2021. Plant Diversity, Ecology, and Evolution. (BIOL SCI,PEOPLE/ENV; 3 cr. ; Student Option; Every Fall)
Will provide students an overview of the entire plant kingdom, their ecology and evolution. prereq: 1009

BIOL 2022. General Botany. (3 cr. ; Student Option; Periodic Fall & Spring)
Principles of plant biology. Organization, function, growth/development, and reproductive biology of plants and plant-like organisms. Lab included. prereq: 1009 or 1009H

BIOL 2032. General Microbiology. (4 cr. ; Student Option; Every Fall)
Fundamental principles of microbiology. Bacterial metabolism, growth, and genetics. Biology of viruses/fungi. Microorganisms and disease. Applied microbiology. Lab. prereq: Biol 1009 or 1009H or 2103, Chem 1001 or 1021

BIOL 2103. Human Anatomy and Physiology I. (4 cr. ; Student Option; Every Fall)
Systems approach to anatomical structures and physiological functions of human body. Key concepts at chemical, cellular, tissue, and organ levels. Emphasizes spacial relationships of structures and their related functions within integumentary, skeletal, muscular, nervous and endocrine systems. Lab. prereq: 1009

BIOL 2104. Human Anatomy and Physiology II. (4 cr. ; Student Option; Every Spring)
Systems approach to anatomical structures and physiological functions of human body. Emphasizes spacial relationships of structures and their related functions within circulatory, lymphatic, respiratory, and digestive systems. Metabolism, nutrition, urinary/reproductive systems, human development. Genetics concepts. Lab. prereq: 1009

BIOL 2994. Introductory Undergraduate Research. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Intermediate independent work in special fields. prereq: instructor's consent

BIOL 3022. Principles of Genetics. (3 cr. ; Student Option; Every Spring)
Basic principles of Mendelian, molecular, and population genetics. Computer simulations/ models used to study aberrations and their implications. Lab. prereq: Biol 1009, Chem 1021 or 1401, Math 1031 or 1131 or 1150

BIOL 3027. Cell Biology. (3 cr. ; Student Option; Every Fall)
Structure/function of prokaryotic/eukaryotic cells, including cell surface, membranes, organelles, cytoskeleton, cell growth, cell physiology, experimental methods used in cell studies. Lab includes contemporary cell biology research techniques, hypothesis testing, and communication of results. Lab. prereq: 1009, [1401 or Chem 1021]

BIOL 3122. Evolution. (3 cr. ; Student Option; Every Spring)
Origin, history, opposition, and evidence supporting evolutionary ideas. Origin of life, phylogeny, biological history, mechanisms of evolutionary change, population genetics, speciation, tempo of evolution, macroevolution, extinction, biogeography. prereq: 1009

BIOL 3131. Plant Physiology. (3 cr. ; Student Option; Periodic Fall & Spring)
Plant functions with emphasis on higher plants. Growth and development, mineral nutrition, translocation, water relations, photosynthesis, and nitrogen metabolism. Lab. prereq: 2022, Chem 1401

BIOL 3140. Histology. (4 cr. ; Student Option; Fall Odd Year)
Microscopic examination of morphological characteristics of human tissues, organs, and blood cells. Lab. prereq: 2104 or 3027 or consent of instructor

BIOL 3420. Ecotoxicology. (3 cr. ; Student Option; Fall Odd Year)
Overview of ecotoxicology ranging from molecular to global issues. Major classes of contaminants, bioaccumulation, toxic effects, and risks. Lab. prereq: CHEM 1001

BIOL 3464. Mammalogy. (3 cr. ; Student Option; Every Fall)
Classification, reproduction, physiology, behavior, ecological adaptations, zoogeography of mammals. Emphasizes techniques used in field/laboratory studies. Lab. prereq: 2012

BIOL 3466. Ornithology. (3 cr. ; Student Option; Every Spring)
Classification, reproduction, physiology, behavior, ecological adaptations, zoogeography of birds. Emphasizes techniques used in field/laboratory studies. Lab. prereq: 2012

BIOL 3496. Special Topics in Biology. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Spring)
Topics cover contemporary issues in biology. Recent/significant primary literature. Critical thinking/evaluation. Application to issues in biological research. prereq: 1009, 1009H

BIOL 3520. Exercise Physiology. (4 cr. ; Student Option; Every Fall)
This course will educate students on the interelationships between energy intake, energy transfer, and energy expenditure during exercise as well as the physiological systems that support and sustain energy transfer. Students will learn how the body responds under acute exercise conditions and physiological adaptations as a result of chronic exercise..

BIOL 3722. Limnology. (3 cr. ; Student Option; Fall Even Year)
Description/analysis of events in lakes, streams, and ponds, beginning with their origins and progressing through their physics, chemistry, and biology. These parameters interrelated with population of aquatic environment. Lab. prereq: Biol 2022, Chem 1001, Phys 1012, Math 1031 or 1131 or 1150

BIOL 3804. Individual Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr or instructor consent

BIOL 3822. Techniques in Molecular Biology. (4 cr. ; Student Option; Spring Even Year)
Basic recombinant DNA techniques. Methods for growing, isolating, and purifying recombinant DNA and cloning vectors. DNA sequencing, sequence analysis. Gene expression. Polymerase chain reaction (PCR). Other current techniques. Lab. prereq: 2032, 3022, [CHEM 3021 or concurrent registration in CHEM 3021]

BIOL 3899. Pre-Internship Seminar. (0.5 cr. ; Student Option; Every Spring)
Expectations/responsibilities of internship. Preparing for graduate school application/ job search. Presentations about internship experiences by those who have recently completed 3900 (internship). Discussions between students, staff, and invited guests.

BIOL 3900. Internship. (1-2 cr. ; Student Option; Every Fall, Spring & Summer)
Credit given for professional work experience outside an academic deparment. prereq: 3899, department approval, consent of instructor

BIOL 3901. Post-Internship Seminar. (0.5 cr. ; Student Option; Every Spring)

Students who have recently completed internships prepare/deliver PowerPoint presentation on experience. Discussions between post-/pre-internship students, staff, and invited guests. prereq: 3900

BIOL 3994. Undergraduate Research. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Advanced independent work in special fields. prereq: Instructor's consent

BIOL 4101. Biology Seminar. (1 cr. ; Student Option; Every Fall & Spring)
Survey of current literature. Preparation/ presentation of selected topics. Evaluation of seminars. Utilizing contemporary research/ presentation technologies. prereq: Sr

BIOL 4361. Developmental Biology. (4 cr. ; Student Option; Fall Even Year)
Molecular/cellular mechanisms of development. Emphasizes animal systems. Cell cycle, gametogenesis, fertilization, morphogenetic movements, cytodifferentiation, cell interactions, pattern formation, gene expression, organogenesis, metamorphosis, regeneration and aging. Lab. prereq: 3022, 3027

Chemistry (CHEM)

CHEM 1001. Introductory Chemistry. (PHYS SCI; 4 cr. ; Student Option; Every Fall & Spring)
For students who do not need professional-level general chemistry. Atomic and molecular structure, inorganic nomenclature, chemical equations, quantitative relationships, phases of matter, solution chemistry, chemical dynamics, acid/base chemistry, oxidation-reduction process. prereq: High school algebra, high school chem

CHEM 1002. Calculations and Conversions in Chemistry. (PHYS SCI; 1 cr. ; Student Option; Every Fall & Spring)
For students who need/desire to strengthen their skills in measurement, significant figures, units, mathematical calculations, mathematical conversions using the unit dimensional analysis process, and other problem-solving applications in chemistry. prereq: low score on skills test or elect to enroll; co-req: 1001

CHEM 1061. Chemical Principles I. (PEOPLE/ENV,PHYS SCI; 3 cr. ; Student Option; Every Fall)
Concepts of inorganic chemistry, atomic theory/ structure, periodicity of elements. Basic rules of oxidation/chemical combination. Molecular structure (hybridization, molecular orbitals). Thermochemistry, gases, solution process, colligative properties. prereq: 1001

CHEM 1062. Chemical Principles II. (3 cr. ; Student Option; Every Spring)
Behavior of gases, thermodynamics, properties of solutions, solution equilibria, oxidation/ reduction reactions. Rigorous course. Develops chemical foundations required in some agriculture, environmental, preprofessional programs. prereq: 1061 minimum C- grade, 1065

CHEM 1065. Chemical Principles I Laboratory. (PEOPLE/ENV,PHYS SCI; 1 cr. ; Student Option; Every Fall)
Basic laboratory skills. Investigating physical/ chemical phenomena associated with lecture material. Experimental design, data collection/ treatment, discussion of errors, proper treatment of hazardous wastes. prereq: 1001

CHEM 1066. Chemical Principles II Laboratory. (1 cr. ; Student Option; Every Spring)
Basic laboratory skills. Investigating physical/ chemical phenomena associated with lecture material. Experimental design, data collection/ treatment, discussion of errors, proper treatment of hazardous wastes. prereq: 1061 minimum C- grade, 1065

CHEM 1401. Elementary Bioorganic Chemistry. (PHYS SCI; 4 cr. ; Student Option; Every Fall)
Organic chemistry as applied to important biochemical molecules.

CHEM 2301. Organic Chemistry I. (3 cr. ; Student Option; Every Fall)
Important classes of organic compounds, their structures/reactions. Relation between structure, reactivity, and properties. Spectroscopic characterization of organic molecules. prereq: 1062, 1066, concurrent enrollment in 2310

CHEM 2302. Organic Chemistry II. (3 cr. ; Student Option; Every Spring)
Reactions, synthesis, and characterization of organic compounds and biologically significant classes of organic compounds (lipids, carbohydrates, amino acids, proteins, nucleic acids). prereq: [Grade of at least C- in 2301 or consent of instructor], concurrent enrollment in 2311

CHEM 2310. Organic Chemistry Laboratory I. (2 cr. ; Student Option; Every Fall)
Laboratory techniques in synthesis, purification, and characterization of organic compounds. prereq: Concurrent enrollment in 2301

CHEM 2311. Organic Chemistry Laboratory II. (2 cr. ; Student Option; Every Spring)
Lab techniques in synthesis, purification, and characterization of organic compounds. prereq: 2310, concurrent enrollment in 2302

CHEM 2994. Introductory Undergraduate Research. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Intermediate independent work in special fields. prereq: 2301, 2310, instructor's consent

CHEM 3021. Biochemistry. (3 cr. ; Student Option; Every Spring)
Fundamentals of biochemistry. Structure/ function of proteins, nucleic acids, lipids, and carbohydrates. Metabolism, regulation of metabolism. Quantitative treatments of chemistry equilibria, enzyme catalysis, and bioenergetics. Chemistry basis of genetic information. prereq: Grade of at least C- in [2301 or consent of instructor], BIOL 1009

CHEM 3022. Chemical Analysis in the Biological and Environmental Sciences. (4 cr. ; Student Option; Spring Odd Year)
Theories/techniques of quantitative chemical analysis. Covers data handling, atomic/ molecular spectroscopies, gas/liquid chromatography, and mass spectrometry. Labs focus on application of quantitative chemical methods to problems encourntered in environmental science/biology. prereq: 2301, 2310

CHEM 3994. Undergraduate Research in Chemistry. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Laboratory techniques used in chemistry. Literature pertaining to field. Students write proposals for UROP/UROC grants. prereq: 2301, 2310

Communication (COMM)

COMM 2000. Introduction to Communication. (; 1 cr. ; Student Option; Every Spring & Summer)
Field/program of communication. Orientation to internships.

COMM 2002. Interpersonal Communication. (COMMUNICAT; 3 cr. ; Student Option; Every Fall & Spring)
Fundamental concepts/skills of communication used in social/career contexts. Perception, listening, verbal/nonverbal, climate, conflict.

COMM 2110. Communication Technology Trends. (; 3 cr. ; Student Option; Every Fall)
Introduction to current/emerging industry standard software including design, presentation, social media as used in organizations.

COMM 2334. Communication Topics. (; 3 cr. ; A-F or Audit; Periodic Fall & Spring)
Applying writing process to professional communication situations. Dissemination products containing text/visuals meeting professional community standards. prereq: COMP 1013

COMM 3000. Communication Theory. (; 3 cr. ; Student Option; Every Fall)
Identifying, defining, synthesizing, applying, and critiquing communication theories. Focuses on relationship between theory/ practice within interpersonal, group, organizational, and social settings. prereq: COMP 1013, SPCH 1101

COMM 3001. Human Relationships and Leadership. (HUMAN DIV; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Anti-relational/relational communication, interpersonal/group processes, conflict management, collaboration, team building, and leadership.

COMM 3008. Business Writing. (; 3 cr. ; Student Option; Every Fall & Spring)
Practical application of writing effective business letters, memos, e-mails, faxes. Tables, other graphics. Informal/formal informational/analytical reports. Professional oral/Web presentations. Development of personal writing style. Practice of appropriate business tone, etiquette. prereq: Comp 1013 or 6 credits of writing

COMM 3431. Persuasion. (; 3 cr. ; Student Option; Every Spring)
Persuasion in interpersonal, organizational, intra-/inter-cultural relationships. Contemporary persuasion with historical segments. Argumentative claims, how to analyze/respond coherently to them. prereq: SPCH 1101

COMM 3537. Visual Communication. (; 3 cr. ; Student Option; Fall Odd Year)
Visual delivery of end-products in professional communication. Classical/contemporary theories of visual delivery. Designing visual delivery to reflect personal philosophy of communication. Integrating visual delivery system with text to meet professional/client standards. prereq: Comp 1013

COMM 3610. Corporate Training. (; 3 cr. ; Student Option; Fall Odd Year)
Using training models to create leader led, self study, and on-the-job instructor/ participant training materials. Creating job aids. Implementing/evaluating training courses.

COMM 3704. Business and Professional Speaking. (; 3 cr. ; Student Option; Every Fall)
Developing proficiency in communication/ presentation skills in business contexts. Preparing, selecting, organizing, designing, and delivering oral messages in business situations. Meeting/group facilitation, interviewing, and professional presentations. prereq: COMP 1013, SPCH 1101

COMM 3710. Event Planning and Management. (; 3 cr. ; Student Option; Fall Even Year)
Using project management techniques to plan, market, implement, and evaluate small-/large-scale events.

COMM 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topic related to student's major, not covered in regularly offered courses. prereq: Jr or instructor consent

COMM 3855. Topics in Communication. (; 3 cr. [max 9 cr.] ; Student Option; Periodic Fall & Spring)
Current trends/practices in communication. Editing, training, event planning, political communication. prereq: Jr

COMM 3857. Technical Communication. (; 3 cr. ; Student Option; Spring Odd Year)
Creating complex documents such as policies/ procedures, manuals, instructions for clients. Team writing. Working with subject matter experts/technical topics. Usability testing/ revision. Managing complex writing projects. Creating multiple documents as part of series. prereq: Comp 1013

COMM 3900. Internship. (; 3 cr. [max 6 cr.] ; A-F only; Every Fall, Spring & Summer)
Supervised professional work experience at selected sites. Reports/consultation with faculty adviser/employer. prereq: 12 cr of COMM courses

COMM 4000. News and Social Media Communication. (; 3 cr. ; Student Option; Every Fall)
Analyze traditional media/social media uses and strategies. Develop social media content. Write press releases using Associated Press (AP) style. Develop a comprehensive media/ social plan.

COMM 4002. Intercultural Communication. (; 3 cr. ; Student Option; Fall Odd Year)
Interrelationship of cultures/co-cultures. Interpreting diverse communication through literature, popular culture, and academic sources. Cultural values, world views, philosophies, patterns, meanings. Communication strategies across cultures. prereq: 3001

COMM 4007. Political Communication. (; 3 cr. ; Student Option; Spring Even Year)
Theory of political ideology. Organizational politics/influences. Campaigns. Social movements. prereq: POL 1001 recommended

COMM 4704. Organizational Communication. (; 3 cr. ; Student Option; Every Spring)
Using communication processes to create/ maintain organizations (e.g., meetings, employee assimilation, interpersonal relationships, decision making, leadership). Recognizing/identifying communication issues in organizations and applying organizational communication concepts, models, tools, and theories to resolve them. prereq: 3000, COMP 1013, SPCH 1101

COMM 4800. Crisis Communication. (; 3 cr. ; Student Option; Spring Odd Year)
Organizational crises, disasters, emergency situations. Existing academic literature, everyday media literature. Focuses on appropriate communication strategies, written composition, and delivery of speeches. prereq: COMP 1013, SPCH 1101

COMM 4802. Publication Design and Management. (; 3 cr. ; Student Option; Spring Even Year)
Applying project management principles to manage publication from concept to final product. Design principles, desktop publishing software, audience analysis, usability testing, production. Using table presentations to communicate process, final product to clients/ guests. prereq: Comp 1013, Spch 1101

COMM 4850. Report Writing. (; 3 cr. ; Student Option; Fall Odd Year)
Analyzing documents and conducting interviews to develop reports for assessment and other purposes. prereq: 3303

COMM 4900. Public Relations. (; 3 cr. ; Student Option; Spring Odd Year)
Overview of theory, practice, roles, and techniques in public relations within organizations. Writing news releases. Conducting news conferences, planning/ implementing events. Responding to challenging questions from audience members. Conducting public relations audit of organization. prereq: COMP 1013, SPCH 1101

COMM 4999. Seminar in Communication. (; 2 cr. ; Student Option; Every Spring)
Synthesizes/integrates communication experience. Documents experiences through oral/written reports. prereq: Within 2 semesters of graduation

Composition (COMP)

COMP 1000. College Writing Laboratory. (1 cr. ; Student Option; Every Fall & Spring)
Supplemental instruction in writing. Small group activities, individual conferencing. prereq: concurrent enrollment in 1011

COMP 1011. Composition I. (COMMUNICAT; 3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Process of clear, concrete, and convincing writing. Generation and discovery of subjects, revisions, editing.

COMP 1011H. Honors: Composition I. (COMMUNICAT; 3 cr. ; Student Option; Every Fall)
Process of clear, concrete and convincing writing. Generation and discovery of subjects, revisions, editing. prereq: Admittance in the Honors Program

COMP 1013. Composition II. (COMMUNICAT; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Writing a research paper/s. Formulating/ answering a research question. Developing an organizational/argument strategy for topic/ audience. Supporting research question/ argument with scholarly sources. prereq: 1011

COMP 1013H. Honors: Composition II. (COMMUNICAT; 3 cr. ; Student Option; Every Spring)
Writing summaries, writing to synthesize material from several sources, evaluating readings and other materials, research writing prereq: [1011 or 1011H], admittance to Honors Program

Computer Applications (CA)

CA 1010. Introduction to Computer Technology. (; 1 cr. ; Student Option; Every Fall & Spring)
Introduction to computer literacy, care of laptop, policies, e-mail and word processing essentials, PALS and portfolio development.

CA 1012. Application Suite Software. (; 3 cr. ; Student Option; Every Fall)
Introduction to word processing, spreadsheet, and presentation graphics.

CA 1015. Word Processing and Publishing Applications. (; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Desktop publishing techniques using Microsoft Word in the generation and development of advanced word processing documents; using Microsoft Publisher for the creation, design, and production of professional quality documents that combine, text, graphics, illustrations, and photographs for camera ready publications.

CA 1020. Spreadsheet Applications. (; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Personal/presentation use of spreadsheets that include formulas, functions, what-if analysis, and charts. Focuses on applying spreadsheet applications to individual academic disciplines.

CA 1030. Multimedia Applications. (; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Developing advanced graphics, animation, and audio/video materials for personal/professional presentations.

CA 1040. Web Site Development. (; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Web site design. current HTML, scripting, graphics, Web services, user interface design.

CA 1055. Animation Software Applications. (; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Fundamentals of animation applications. Students create animated page for Web sites and interactive learning components for gaming and E-learning.

CA 1060. Database Applications. (; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Techniques for designing, developing, prototyping, creating, querying, reporting, and maintaining databases with MS Access.

CA 2190. Topics in Computer Applications. (; 1-3 cr. ; Student Option; Every Fall, Spring & Summer)
Topics related to advanced computer application certification, such as MOS, IC3, COmp TIA, Linux, and Oracle.

Criminal Justice (CRJS)

CRJS 1500. Introduction to Criminal Justice. (ETH/CIV RE,HI/BEH/SSC; 4 cr. ; Student Option; Every Fall, Spring & Summer)
Analysis of criminal justice system. Focuses on police, courts, corrections, and notion of justice in American society.

CRJS 1803. Directed Studies. (1-15 cr. ; Student Option; Every Fall, Spring & Summer)
Current topics not covered in regularly offered courses. prereq: Instructor consent

CRJS 2100. Crime and Criminology. (; 3 cr. ; Student Option; Every Fall & Summer)
Legal definitions of criminal/deliquent behavior. Typologies of crime/criminals. Trends in reported distribution of crime/delinquency within population. Theoretical explanations.

CRJS 2390. Special Topics in Criminal Justice. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Independent investigation of topics of special interest related to criminal justice. Topics vary to reflect contemporary criminal justice issues.

CRJS 2400. Introduction to Corrections. (; 3 cr. ; Student Option; Every Spring & Summer)
Penology. History, philosophy, programs, policies, problems associated with correctional practice. Topics include probation, prisons, jails, parole, community corrections, alternative sanctions. prereq: 1500

CRJS 2500. Introduction to Policing. (; 3 cr. ; Student Option; Every Spring & Summer)
Development of police in America, past, present, future. Institutional context of police activity. Bureaucratization of police. Professionalization, role of police. Police/community change. prereq: 1500

CRJS 2550. Traffic Law. (; 2 cr. ; Student Option; Every Spring & Summer)
Motor vehicle/traffic code. Private/commercial vehicle regulations. Licensing regulations.

CRJS 2560. Emergency Medical Responder. (3 cr. ; S-N only; Every Spring)
Care for traumatic accidents, injuries, medical emergencies. Successful completion of course results in certification as emergency medical responder with Minnesota Emergency Medical Services Regulatory Board (EMSRB).

CRJS 3350. Criminal Justice Administration. (; 3 cr. ; Student Option; Every Spring & Summer)
Application of leading administrative theories to problems of criminal justice system. Bureaucratic nature of American criminal justice system as complex organization.

CRJS 3455. Institutional Corrections. (; 3 cr. ; Student Option; Every Fall & Summer)
Function, structure, operation of American adult/juvenile correctional institutions.

CRJS 3465. Strategies in Correctional Rehabilitation. (; 3 cr. ; Student Option; Every Fall & Summer)
Treatment philosophies/strategies for supervision, parole, probation. Community-based correctional alternatives. Offender classification. Special offender groups. Treatment, custody, recidivism. Strategies to change offender conduct. prereq: 2400

CRJS 3475. Community Corrections. (; 3 cr. ; Student Option; Every Spring & Summer)
Intervention strategies as alternatives to institutional corrections in sentencing adjudicated persons. Community corrections, parole, house arrest, restitution, community service. Development of intervention services in support of dispositions.

CRJS 3505. Judicial Process. (; 3 cr. ; Student Option; Every Fall & Summer)
Criminal justice judicial process. Judicial involvement from pre-arrest warrant issuance to appellate court review. Role/behavior of prosecutors, defense attorneys, judges. prereq: 1500

CRJS 3515. Criminal Justice Ethics. (; 3 cr. ; Student Option; Every Spring & Summer)
Ethical issues/dilemmas facing practitioners in criminal justice. Students' own ethical questions pertaining to area of interest. Development of solutions to dilemmas.

CRJS 3520. Natural Resource Law Enforcement Techniques. (; 3 cr. ; Student Option; Spring & Summer Odd Year)
Methods, procedures, techniques in natural resource field law enforcement work. Natural resource case law. Applicable statutes pertaining to tenets of search/seizure, arrest, surveillance, court system. prereq: 1500, NATR 1233

CRJS 3525. Juvenile Justice and Delinquency. (; 3 cr. ; Student Option; Every Fall & Summer)
Processing/treatment of juvenile offenders. Organization, operations, goals of individuals, agencies, institutions that work with offenders.

CRJS 3530. Criminal Justice Diversity. (; 3 cr. ; Student Option; Every Fall & Summer)
Dynamics of class, race, gender as they intersect with crime/justice in the United States. How class, race, gender separately/together influence criminal justice system. Reforms to reduce bias in crime control.

CRJS 3550. Criminal Investigation. (; 3 cr. ; Student Option; Every Spring & Summer)
Rules of evidence in criminal investigation/court. Relevant issues, legal standards. Principles/techniques in criminal investigation procedures/surveillance. prereq: 2500

CRJS 3575. Critical Issues in Policing. (; 3 cr. ; Student Option; Every Fall & Summer)
Function of law enforcement, roles of police in modern society. Police organizations/officers/work. Critical problems, policing strategies. Dealing with mentally disturbed. Police-minority/-community relations. prereq: 2500

CRJS 3804. Individual Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Instructor's consent

CRJS 3900. Criminal Justice Field Placement (Internship). (3 cr. ; Student Option; Every Fall, Spring & Summer)
Observation, participation, and study in selected criminal justice agencies. prereq: Instructor consent

CRJS 4315. Women and Crime. (; 3 cr. ; Student Option; Every Fall & Summer)
Historical/theoretical perspectives, contemporary trends concerning women and crime. Processing of women by criminal justice system. Women as criminal justice professionals.

CRJS 4390. Special Topics in Criminal Justice. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Spring & Summer)
Independent investigation of topics of special interest related to criminal justice. Topics vary to reflect contemporary criminal justice issues.

CRJS 4435. Theories of Punishment. (; 3 cr. ; Student Option; Every Spring & Summer)
Philosophical issues associated with criminal punishment.

CRJS 4510. Victimology. (; 3 cr. ; Student Option; Every Fall & Summer)
Criminological examination of victims. Victim reactions. Responses by criminal justice system/other societal agencies.

CRJS 4540. Criminal Law. (; 4 cr. ; Student Option; Every Fall & Summer)
Elements of criminal offenses in the United States/Minnesota. Crimes against persons/property. Administration of justice. Cases outline judicial interpretation of criminal law.

CRJS 4550. Criminal Procedure. (; 4 cr. ; Student Option; Every Spring & Summer)
Rights of criminally accused, primarily in pretrial stages. Bill of Rights. Constitutional law. Police procedures permissible within confines of federal/state constitutions.

Early Childhood Education (ECE)

ECE 3410. Learning Environments for Infants and Toddlers. (4 cr. ; A-F only; Every Spring)
Designing, organizing, and maintaining learning environment. Arrangement of physical setting, provision of materials, construction of curriculum, implementation of learning experiences. Assessment of child's learning and of teaching/learning environment. Field Experiences. prereq: 2100, Ed 3110, minimum GPA of 2.5

ECE 3420. Nurturing and Collaborative Relationships for Infants and Toddlers. (2-3 cr. ; A-F only; Every Spring)
Understanding/applying practices to promote emotional/social development in infancy/toddlerhood. Principles of caregiving. Relationship to teaching/learning environment. Developmentally appropriate guidance, collaborative parent/staff relationships, respecting family/cultural values/experiences. prereq: 2100

ECE 3804. Individual Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topic related to student's major and not covered in regularly offered courses. prereq: Jr, instructor consent

ECE 4440. Infant and Toddler Student Teaching. (4 cr. ; A-F only; Every Fall, Spring & Summer)
Students integrate theory/practice as member of teaching team. Portfolio-based student-teaching experience. Focuses on selected BOT competencies/indicators. University approved classroom placement. prereq: 3410, 3420, 4750, 3901, minimum GPA of 2.50, achievement of passing scores on 2 of the 3 Basic Skills Tests required by the Minnesota Board of Teaching

ECE 4700. Creative Arts and Language Arts: Preprimary. (4 cr. ; A-F only; Every Fall)
Theory/practice related to preprimary (preschool, kindergarten) education. Development related to learning environment, curriculum, and teaching methods. Developmentally appropriate approaches to subject matter in language arts, literacy, and expressive arts. Field experiences. prereq: 2100, 2300, ED 3110 or concurrent enrollment, minimum GPA of 2.50

ECE 4702. Mathematics, Social Studies, and Sciences: Preprimary. (4 cr. ; A-F only; Every Spring)
Theory/practice related to preprimary education (preschool, kindergarten). Development related to learning environment, curriculum, and teaching methods. Developmentally appropriate approaches to subject matter in mathematics and in physical/social sciences. prereq: 4700

ECE 4730. Understanding and Supporting Parenting. (3 cr. ; A-F only; Every Fall)
Parent-child relationships, adult development, family systems theory, parental authority, child compliance, developmental interaction during child rearing years. Parenting in diverse family configurations, in diverse cultures/lifestyles, and in high-risk families. Emphasizes knowledge of research for application. prereq: 2300, 3420, concurrent enrollment in Ed 3110, minimum GPA of 2.5

ECE 4811. Preschool Student Teaching. (6-8 cr. ; A-F only; Every Fall, Spring & Summer)
Integrate theory/practice as member of teaching team. Portfolio-based student-teaching experience. Selected BOT competencies/indicators. University approved classroom placement in preschool-aged setting. prereq: 3901, 4702, 4750, ED 3110, minimum GPA of 2.50, achievement of passing scores on 2 of the 3 Basic Skills Tests required by the Minnesota Board of Teaching

ECE 4812. Kindergarten Student Teaching. (4 cr. ; A-F only; Every Fall & Spring)
Integrate theory/practice as member of teaching team. Portfolio-based student-teaching experience. Focuses on selected BOT competencies/indicators. University approved classroom placement in kindergarten classroom. prereq: 3901, 4702, 4750, Ed 3110, minimum GPA of 2.5, achievement of passing scores on 2 of the 3 Basic Skills Tests required by the Minnesota Board of Teaching

ECE 4883. Student Experiences in Program Management. (3.5 cr. ; Student Option; Every Spring)
Integrate theory/practice as member of management team. Portfolio based capstone focusing on manager/director competencies articulated by national/state organizations. University approved placement in early childhood program serving children 6 weeks to 8 years of age. prereq: 4880

Economics (ECON)

ECON 1010. Global Trade Economics. (GLOB PERSP; 3 cr. ; Student Option; Every Fall)
Overview of ecological/demographic/economic factors influencing current agricultural, industrial, environmental development issues.

ECON 1111. Personal Finance. (ETH/CIV RE; 3 cr. ; Student Option; Every Fall)
Strategies, techniques, resources for managing/planning personal finances. Budgeting, investments, housing, insurance, taxation. Credit. Job selection, planning for retirement, installment buying.

ECON 2101. Microeconomics. (HI/BEH/SSC; 3 cr. ; Student Option; Every Fall & Spring)
Basic economic principles of pricing, resource allocation, consumption. Supply/demand, cost of production, consumer behavior. Competition/influences of market structure. prereq: Math 0991 or 2 yrs high school algebra or equiv

ECON 2102. Macroeconomics. (HI/BEH/SSC; 3 cr. ; Student Option; Every Fall & Spring)
Big picture of economy. Determinants of national income, national income accounting, unemployment, inflation, economic growth. Classical, Keynesian, recent theoretical approaches to modifying economic activity. Monetary/fiscal policies. International economic relations.

Education (ED)

ED 2000. Educational Technology for P-12th Settings. (2 cr. ; A-F only; Every Fall)
Use of current technology applicable to P-12 classroom settings; integration of technology in support of student learning and instruction; appropriate use and ethical issues surrounding use of technology in education. prereq: Minimum GPA of 2.5

ED 2100. Child and Adolescent Development and Learning. (HI/BEH/SSC; 3 cr. ; A-F only; Every Fall & Spring)
Study of principles and major theories of development from birth through adolescence. Age trends, individual/group differences, factors which affect development/learning. Evidence-based applications.

ED 2200. Foundations of Education. (3 cr. ; A-F only; Every Fall)
Roles, responsibilities, duties, functions, routines, requirements of public school teachers. Historical, social, political foundations of public education. Role of education in a pluralistic society. Issues affecting education in American public schools. prereq: Completion of Pre-Professional Skills Test [PPST]; Minimum GPA of 2.5

ED 2300. Introduction to Early Childhood and Elementary Education. (3 cr. ; A-F only; Every Spring)
Historical, philosophical, sociological foundations of early childhood/elementary education. How foundations influence current thought, practice, instruction in classroom. Current issues that affect children, families, programs, schools, profession. Field experience. prereq: Minimum GPA of 2.50

ED 2400. Introduction to Middle and High School Education and Experiential Learning. (3 cr. ; Student Option; Every Spring)
Pedagogy related to uniqueness of early/late adolescent education; utilization of media/technology to enrich learning applications for middle/high school education; core principles/theories of experiential learning. prereq: 2200

ED 2860. Mathematics for Elementary Teaching. (2 cr. ; A-F only; Every Spring)
Mathematics content matter for elementary school teaching. Five strands. Number and operation, algebra, geometry, measurement, data analysis, and probability. prereq: 2200, minimum GPA of 2.50

ED 2877. Social Studies in Elementary Education. (2 cr. ; A-F only; Every Spring)
Concepts/tools for teaching social studies as inquiry through a constructivist approach. prereq: GPA of at least 2.50

ED 2878. Science in Elementary Education. (2 cr. ; Student Option; Every Spring)
Concepts/tools for teaching science as inquiry through a constructivist approach. prereq: GPA of at least 2.50

ED 3000. Cultural Immersion. (1 cr. [max 3 cr.] ; A-F only; Periodic Fall, Spring & Summer)
Three to five days in a school setting that primarily serves minority children/families. Students observe, participate, and teach mini-lessons. Interview teachers. Demonstrate understanding of cultural and community diversity and how to incorporate children's experiences and culture into instruction.

ED 3009. Human Relations in Diversity. (1 cr. ; Student Option; Every Spring)
Biases, discrimination, prejudice, personal/institutional oppression in terms of history, social/educational contexts. Create responsive learning environments that contribute to self-esteem/positive interpersonal relations.

ED 3010. Child Guidance and Classroom Management. (3 cr. ; A-F only; Every Fall)
Theories, principles, and practices of child guidance and managing classrooms. Social/emotional competence of children/students. Peer relations and violence prevention. prereq: 2200, ECE 2100, GPA of at least 2.50

ED 3110. Educational Psychology. (3 cr. ; A-F only; Every Spring)
Teaching/learning process: (1) planning/effective instruction; (2) behavioral/cognitive views. Emphasizes how learning is affected by development, individual differences, motivation. prereq: 2200, ECE 2100, minimum GPA of 2.5

ED 3201. Reading and Language Arts. (4 cr. ; A-F only; Every Spring)
Instructional principles, standards, practices, and curriculum materials for becoming an effective teacher of literacy in elementary classrooms. Assessment tools and practices to plan and evaluate effective reading instruction. prereq: 3110, 3301, ECE 4700, GPA of at least 2.50

ED 3202. Writing and Language Arts. (2 cr. ; Student Option; Every Fall)
Writing foundation principles, standards, practices, and assessment tools for planning writing instruction and becoming an effective teacher of writing in elementary classrooms. prereq: 3201, 3301

ED 3210. Reading in the Content Area. (2 cr. ; Student Option; Every Fall)
Designed to meet requirements of Minnesota statute requiring teachers receiving an initial license to have preparation in "scientifically-based reading instruction".

ED 3301. Creating Meaning Through Literature and Arts. (4 cr. ; A-F only; Every Fall)
Course in children's literature designed to prepare pre-service teachers to integrate literature, art, drama, dance/movement, and music throughout the curriculum from a constructivist view of learning. Field experiences. prereq: Minimum GPA of 2.50

ED 3500. Introduction to Children with Special Needs. (2 cr. ; Student Option; Every Spring)
Overview of special education public laws/processes of identifying students with disabilities. Introduction of children with low/high incidence disabilities/giftedness. Definitions, causes, characteristics, education implications. IFSP/IEP. Field experiences required. prereq: 2.5 cum GPA

ED 3600. Classroom Management in Middle School and High School Settings. (3 cr. ; Student Option; Every Fall)
Managing students' learning and the classroom environment in work/community/family education programs. Strategies for middle/high school education including supervised internship/teaching experiences. prereq: 2400

ED 3800. Elementary Education Classroom Experiences. (0.5 cr. [max 2 cr.] ; Student Option; Every Fall & Spring)
Directed field experiences in elementary classrooms implementing curriculum lessons. Taken for two semesters concurrently with curriculum courses. prereq: GPA of at least 2.50, adviser consent

ED 3870. Methods of Teaching Mathematics in Elementary Education. (3 cr. ; A-F only; Every Fall)
Facilitating the learning of mathematics in a constructivist environment through the use of investigations, manipulatives, technology, and holistic forms of assessment. Current trends, documents created by the National Council of Teachers of Mathematics. prereq: 3110, 2860, concurrent enrollment in ECE 4702, GPA of at least 2.50

ED 3901. The Professional Teacher I. (0.5 cr. ; A-F only; Every Fall & Spring)
Role of student teacher in planning for full-time teaching. Orientation to student teaching handbook with related assignments. Development of standards based student teaching notebook. prereq: GPA of at least 2.50

ED 3902. The Professional Teacher II. (1 cr. ; A-F only; Every Fall & Spring)
Completion/evaluation of professional standards-based portfolio, teacher licensure application. Taken concurrently with last student teaching experience. prereq: 3901

ED 3904. Teacher Education Topics. (; 1-4 cr. ; Student Option; Periodic Fall, Spring & Summer)
Investigation/application/assessment of specific competencies which have been added/required for teacher candidates by licensing authorities. prereq: 2.5 cum GPA

ED 4000. Educational Technology Applications. (1 cr. ; A-F only; Every Spring)
Apply various media and educational technology resources to enrich learning opportunities,and maximize learning for learners with diverse backgrounds, characteristics, and abilities. prereq: 2000; minimum GPA of 2.50

ED 4400. Teaching Grades 5-12 Students in Inclusive Environments. (2 cr. ; Student Option; Every Fall)
Addresses key aspects of developing, teaching/learning in inclusive settings. Topics on universal design learning (UDL), accommodation, modification/adaptation for students with mild, moderate, severe disabilities. Field experiences required. prereq: 3500

ED 4500. Teaching in Inclusive Learning Environments. (2 cr. ; A-F only; Every Spring)
Addresses key aspects of developing/teaching/learning in inclusive settings. Topics include early intervention techniques, universal design, strategies in accommodation, modification/adaptations for students with mild, moderate, severe disabilities. Field experiences required. prereq: 3201, 3500, ECE 3410, 4700, minimum GPA of 2.50

ED 4750. Family, School, and Community Relations. (3 cr. ; A-F only; Every Fall)
Emphasizes family involvement as essential to successful education. Patterns in family-school relations, trends, problems that inhibit parent involvement. Strategies for productive family involvement. Community/cultural considerations. prereq: 4730, minimum GPA of 2.5

ED 4800. Senior Professional Seminar. (1 cr. ; Student Option; Every Spring)
Orientation to the student teaching internship. Reflective learning on teacher preparation experience including issues/challenges facing the profession. Professional issues will be addressed including licensure, portfolios, Teacher Performance Assessment, teaching code of ethics. Taken concurrently with the teaching internship. prereq: Sr status or instructor approval

ED 4827. Elementary Student Teaching. (7 cr. ; A-F only; Every Fall & Spring)
Students teach in public school classroom with guidance/supervision by University supervisors/cooperating classroom teachers. Focuses on achievement of selected Board of Teaching standards. prereq: Sr status, advisor approval, achievement of passing scores on 2 of the 3 Basic Skills Tests required by the Minnesota Board of Teaching

ED 4880. Leading and Collaborating in Education. (3 cr. ; A-F only; Every Fall)
Preparing educators to provide leadership for integrating educational programming, comply with professional standards, manage a healthy learning environment, and promote collaborative working conditions. prereq: 3410, 4700, 4750, minimum GPA of 2.50

English (ENGL)

ENGL 1005. Introduction to World Literature. (GLOB PERSP,HUMANITIES; 3 cr. ; A-F or Audit; Every Fall & Summer)
Major forms of literature from various cultures/historical periods. Developing informed, personal response to literature/interpretive skills required for appreciation of literature.

ENGL 1016. American Literature: Race, Gender, Class, and the American Dream. (HUMAN DIV,HUMANITIES; 3 cr. ; A-F or Audit; Every Spring & Summer)
American literature from Puritans to present. Develop informed, personal response. Major concerns of American writers in different eras. Introduction to interpretative skills required for appreciation of literature.

ENGL 1017. British Literature. (HUMANITIES; 3 cr. ; Student Option; Fall Odd Year)
British literature from classic to present. Develop informed, personal response to literature. Major concerns of British writers in different eras. Interpretative skills required for appreciation of literature.

ENGL 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Current topics not covered in regularly offered courses.

ENGL 2000. Topics in Literature. (; 3 cr. [max 6 cr.] ; Student Option; Fall Even Year)
Changing focus on genres, cultures, literary topics, eras. Interpretive/writing skills required with focalized intent. Topic titles could include women/literature, war/literature, Modernism, Chinese literture, etc.

ENGL 2001. Introduction to the Field of English. (; 1 cr. ; Student Option; Every Fall)
Allows emerging English majors to learn of the various professions within the field of English in order to plan elective focus within major, double major/minor options, and internship.

ENGL 3001. World Culture and Literature. (GLOB PERSP,HUMANITIES; 3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Representative works from various cultures from around globe. Relevant historical contexts/social movements. Intensified interpretive skills for appreciation of diverse genres.

ENGL 3005. Ancient to 17th Century World Literature. (GLOB PERSP,HUMANITIES; 3 cr. ; Student Option; Every Fall & Spring)
Major forms of literature from ancient/medieval periods to Renaissance. Global focus of relevant historical, cultural, philosophical movements. Intensified interpretive/articulation skills for appreciation of literary evolution.

ENGL 3006. 18th Century to Contemporary World Literature. (GLOB PERSP,HUMANITIES; 3 cr. ; Student Option; Every Spring & Summer)
Major forms of literature from romanticism, realism, modernism, contemporary eras. Global focus of relevant historical, cultural, philosophical movements. Intensified interpretive/articulation skills for appreciation of literary evolution.

ENGL 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses.

ENGL 4000. Intercultural Literature: Conversations between Cultures. (HUMAN DIV,HUMANITIES; 3 cr. ; Student Option; Spring Odd Year)
Study of literature of minority populations in the United States and globally, with an emphasis on cultural and historical contexts that influence literature.

ENGL 4007. Advanced Topics in Literature. (; 3 cr. [max 6 cr.] ; Student Option; Fall Odd Year)
Advanced focus on literary themes/topics. Intensified articulation/interpretive skills required. Topic titles could include Dramatic Literature/Film, Crime/Crisis Literature, etc.

English Education (ENED)

ENED 2001. Early Experience in Communication Arts and Literature. (1 cr. [max 3 cr.] ; Student Option; Every Spring)
Field experiences in grades 5-12 schools offering English education. prereq: minimum GPA of 2.50

ENED 3004. Methods of Teaching Communication Arts and Literature. (4 cr. ; Student Option; Every Fall)
Principles of teaching/learning; teaching resources; instructional planning, implementation and assessments. prereq: Ed 3110, minimum GPA of 2.50

ENED 4800. Student Teaching: Middle School. (3 cr. ; Student Option; Every Fall & Spring)
Student teach in schools offering English education with guidance/supervision by University supervisor/cooperating teachers. Focuses on achievement of selected PELSB standards. prereq: Senior status; advisor approval; achievement of passing scores on 2 of the 3 Basic Skills Tests.

ENED 4900. Student Teaching: High School. (8 cr. ; Student Option; Every Fall & Spring)
Student teach in schools offering English education with guidance/supervision by University supervisor/cooperating teachers. Focuses on achievement of selected PELSB standards. prereq: Senior status; advisor approval; achievement of passing scores on 2 of the 3 Basic Skills Tests

Entrepreneurship (ENTR)

ENTR 2200. Introduction to Entrepreneurship and Small Business. (; 3 cr. ; Student Option; Every Fall & Summer)
Entrepreneurship/economy. Traits/ skills of entrepreneurs, opportunities in entrepreneurship, legal forms of business establishment, self-analysis/fitness for entrepreneurship.

ENTR 3150. Entrepreneurial Marketing. (; 3 cr. ; Student Option; Fall Even Year)
Marketing strategies/tactics in start-up/small venture settings. Development of resource-constrained market plans. prereq: 2200, MKTG 3300

ENTR 3200. Business Planning. (; 3 cr. ; Student Option; Fall Odd Year)
Business start-up/development phase. Planning related to opportunity recognition, product development, marketing, financing. Students research/write basic business plan. prereq: 2200, ACCT 2101

ENTR 3400. Entrepreneurial and Small Business Finance. (; 3 cr. ; Student Option; Spring Odd Year)
Start-up/expansion financing alternatives, requirements for economic development groups. SBA loan guarantees, venture capitalists, small business valuation techniques, financial management practices. prereq: 2200, ACCT 2101, [ACCT 2102 or instructor consent]

ENTR 4200. Field Studies in Entrepreneurship and Small Business. (; 3 cr. ; Student Option; Fall Odd Year)
Consult with local small business or entrepreneurs to solve problems or capitalize on new opportunities. Guest speakers provide insight on philosophies/practices. prereq: 3200, 3400

ENTR 4800. Entrepreneurship and Small Business Strategies. (; 3 cr. ; Student Option; Every Spring)
Capstone course. Prepare/present comprehensive business plan for entrepreneurial venture, including comprehensive financials, marketing plan, business formation/management plan, growth strategy. prereq: 3200, 3400

Environmental Science (ENSC)

ENSC 2055. Hazardous Waste Worker Training. (3 cr. ; Student Option; Spring Odd Year)
History of chemical emergency response laws and regulations, hazard assessments, fire and explosions, oxidizers, ionizing radiation, environmental stresses and hazards, site characterization, air monitoring, protective clothing and respiratory protection, site control, decomtamination and site emergencies will be covered.

ENSC 2056. Hazardous Waste Worker Training Refresher. (1 cr. [max 4 cr.] ; Student Option; Every Spring)
Annual refresher training of hazardous waste worker training. prereq: 2055

ENSC 2994. Introductory Undergraduate Research. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Intermediate independent work in special fields. prereq: instructor's consent

ENSC 3003. Sustainable YoU, Sustainable World. (GLOB PERSP,PEOPLE/ENV; 3 cr. ; Student Option; Every Fall)
Sustainability exists where social equity, environmental integrity and economic prosperity intersect. We will approach sustainability using multiple lenses of understanding to enable students to become more informed about how to become sustainable students, members of the University community and citizens of the world.

ENSC 3124. Environmental Science and Remediation Techniques. (3 cr. ; Student Option; Spring Odd Year)
Advanced understanding of environmental science. Issues surrounding ecosystem management, risk assessment, sustainable energy, water quality, air quality. Remediation techniques(traditional/nontraditional), environmental laws.

ENSC 3132. Environmental Factors and Human Health. (; 3 cr. ; Student Option; Spring Odd Year)

Impact of environmental factors on the development of diseases, including cancer, respiratory diseases, and food-borne illness.

ENSC 3143. Environmental Microbiology. (3 cr. ; Student Option;)
Basic microbiological principles; microbial metabolism; identification and interactions of microbial populations responsible for the biotransformation of pollutants; mathematical modeling of microbially mediated processes; biotechnology and engineering applications using microbial systems for pollution control.

ENSC 3496. Special Topics in Environmental Sciences. (; 1-12 cr. ; Student Option; Every Spring)
Topics cover contemporary issues in environmental sciences. Recent/significant primary literature. Critical thinking/evaluation. Application to research issues in environmental sciences.

ENSC 3720. Fate of Chemicals in the Environment. (4 cr. ; Student Option; Spring Even Year)
How chemicals released into the environment are distributed in water, air, etc., based on chemical/physical properties. prereq: CHEM 2301, CHEM 2310

ENSC 3804. Individual Studies. (1-4 cr. [max 12 cr.] ; Student Option; Every Fall, Spring & Summer)
Topics in environmental sciences not covered by the program courses. prereq: Instructor consent

ENSC 3994. Undergraduate Research. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Advanced independent work in special fields. prereq: instructor's consent

ENSC 4022. Risk Assessment and Environmental Impact Statements. (; 3 cr. ; Student Option; Fall Even Year)
Environmental risk assessments, including cost benefit analysis, risk analysis, risk characterization. Develop environmental impact statements. Toxicity assessment, uncertainty analysis, risk management.

ENSC 4100. Capstone in Environmental Science. (; 2 cr. ; Student Option; Spring Even Year)
Explore controversial environmental topics. Capstone project. Journal about/present project to class at end of semester. prereq: Sr

Equine Science (EQSC)

EQSC 1000. Light Horse Driving. (2 cr. ; Student Option; Every Spring)
Types of driving vehicles and harness, including fine harness, heavy harness, and competitive driving. Hitching/driving the fine harness horse. Techniques for training the fine harness horse to drive. Negotiating obstacles while driving.

EQSC 1002. Equine Careers and Husbandry Practices. (1 cr. ; Student Option; Every Fall)
Technical knowledge and practical experience needed for where students want to be in that industry.

EQSC 1100. Western Equitation. (3 cr. ; Student Option; Every Fall & Spring)
Grooming, handling, safety, identification of equipment, saddling, mounting, correct body position (equitation), cues and their proper use, various riding techniques. Focus is on the development of proper equitation skills and techniques which are used for riding and showing.

EQSC 1200. Hunt Seat & Dressage Equitation. (3 cr. ; Student Option; Every Fall & Spring)
Developing hunt seat skills and techniques, including how to ride a course of jumps. Techniques of "centered riding" will be taught and used. Basic dressage maneuvers and riding lower level dressage tests.

EQSC 1202. Equine Evaluation. (2 cr. ; Student Option; Every Fall)
Conformation, breed characteristics, and type and their importance in evaluation. Performance evaluation, criteria, and scoring methods. Preparation and delivery of oral reasons.

EQSC 1300. Saddle Seat Equitation. (2 cr. ; Student Option; Every Fall)
Saddling, mounting, seat/hands, other saddle seat techniques. Developing equitation skills for saddle seat riding/showing. prereq: 1100 or 1200 or instructor consent

EQSC 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Current topics not covered in regularly offered courses. prereq: Instructor consent

EQSC 2001. Concepts in Dressage Equitation. (3 cr. [max 6 cr.] ; Student Option; Every Spring)
Developing a balanced, classical seat for riding. Dressage techniques, riding a test, collection, advanced maneuvers. Refining skills to develop a supple, obedient horse. prereq: 1200 or instructor consent

EQSC 2102. Horse Production. (4 cr. ; Student Option; Every Fall)
Fundamentals of horse care. Equine nutrition, behavior, diseases. Hoof care. First aid, health care, disease prevention. Parasites. prereq: AnSc 1004

EQSC 2110. Topics in Farrier Science. (; 1 cr. ; Student Option; Every Spring)
The fundamentals of trimming work, anatomy (particularly of limbs), identifying lameness, common hoof ailments, first aid for the hoof, and history of horseshoeing. prereq: 1202

EQSC 2112. Riding Instructor Training. (3 cr. ; Student Option; Every Fall & Spring)
Formulating lesson plans. Teaching methods for individuals or group. Safety, insurance, liability, management. Student's teaching methods are evaluated. prereq: 1000 or 1100 or 1200 or 2001

EQSC 2202. Advanced Equine Evaluation. (2 cr. [max 6 cr.] ; Student Option; Every Spring)
Advanced study of conformation/performance in the horse. Selection of horses of different breeds based on conformation, breed character and movement. Emphasis will be placed on developing a knowledge of industry standards across a variety of disciplines to give the student a solid base for judging horse shows. prereq: 1202 or instructor consent

EQSC 3305. Equine Reproductive Techniques. (3 cr. ; Student Option; Every Spring)
Breeding management practices/techniques. Gestation, fetal development, endocrinology, estrus manipulation, artificial insemination, embryo transfer, cooled and cryopreservation of semen, teasing, and foaling. Lab emphasizes skills required in equine industry. Lecture emphasizes reproductive theory. prereq: 2102, AnSc 3203, 3304 or instructor consent

EQSC 3403. Equine Exercise Physiology. (3 cr. ; Student Option; Every Spring)
Skeletal, muscular, cardiovascular, and regulatory systems of the horse. Effect of work-related stress (mental and physical) using physiological measures and how the systems relate to one another; how various types of conditioning can affect the systems separately and as a whole. prereq: AnSc 3203, EqSc 2102

EQSC 3413. Horse Training and Showing. (3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Work with untrained young horse or older show horse to correct problems or maintain the horse. prereq: 6 crs of equitation courses [from 1100, 1200, 1300, 3441, 3442, 3443], [3412 or concurrent enrollment in 3412]

EQSC 3441. Topics in Advanced Western Equitation. (3 cr. ; Student Option; Every Spring)
Experience in reining maneuvers. Students refine skills. prereq: 1100 or instructor consent

EQSC 3443. Topics in Advanced Equitation Over Fences. (3 cr. ; Student Option; Every Fall)
Experience in riding more challenging course of jumps. prereq: 1200 or instructor consent

EQSC 3495. Current Topics in Equine Science. (; 1 cr. [max 3 cr.] ; Student Option; Periodic Fall & Spring)
Additional coverage of special topics in the equine industry.

EQSC 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

EQSC 4102. Equine Management. (3 cr. ; Student Option; Every Spring)
Fundamentals of horse management. Record keeping (traditional, computer based). Marketing, sales techniques. Legal aspects (e.g., contracts, zoning, liability, insurance). Management project that involves establishing, maintaining, improving an equine business. prereq: Econ 1101

Finance (FIN)

FIN 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Current topics not covered in regularly offered courses. prereq: Instructor consent

FIN 3020. International Financial Management. (; 3 cr. ; Student Option; Fall Odd Year)
International financial markets with risks/ benefits of international operations. Compare operation of global companies with domestic companies regarding foreign exchange fluctuations, political risks, financial tools to address risks, capital budgeting, tax, working capital structure, investment decisions, company's valuation.

FIN 3100. Managerial Finance. (; 3 cr. ; A-F or Audit; Every Fall & Spring)
Principle financial considerations/ratio analysis of business. Cost of capital, asset management, capital structure planning, financial statement analysis, working capital management, short-term financing, budgeting. Integrates theory/applications. prereq: [ACCT 2102 or 3010], [ECON 2101, MATH 1031] or instructor consent

FIN 3105. Corporate Finance. (; 3 cr. ; Student Option; Spring Even Year)
How corporations/other business entities raise capital to finance business endeavors. Legal rules. Transactional/litigation-related aspects of corporate finance. Accounting/valuation. Institutions/players in financial markets. prereq: Fin 3100

FIN 3110. Estate Planning. (; 3 cr. ; Student Option; Fall Even Year)
Accumulation, conservation, distribution of client's acquired property. Estate planning techniques. Identification/use of appropriate forms of wills/trusts. Methods to reduce freezing or eliminating Unified Transfer Tax. Post-mortem planning techniques.

FIN 3115. Insurance and Risk Management. (; 3 cr. ; Student Option; Spring Even Year)
Process for handling business risks. Property/ liability risks, employee benefit planning, international loss exposures. Risk identification/ evaluation. Risk control/financing techniques.

FIN 3120. Money, Banking and Financial Institutions. (; 3 cr. ; Student Option; Fall Odd Year)
Principles/roles of money, banking, financial system. Interest rate, monetary policies of central banks. Financial instruments, asset pricing, determination/behavior of interest rates/exchange rates. Management, structure regulation of banking system.

FIN 3125. Investments. (; 3 cr. ; Student Option; Spring Odd Year)
Key concepts in investment theory from perspective of portfolio manager. Investment theory/problems. Current academic work/ application for portfolio choice. prereq: Mgmt 3100

FIN 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

FIN 3900. Internship. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Employed as interns in business firms, institution or agency. Reports/consultations with faculty/employers required.

Foreign Study (FOST)

FOST 3201. Study Abroad (UMC). (1-18 cr. [max 36 cr.] ; Student Option; Every Fall, Spring & Summer)
Study abroad programs/courses approved by and offered through UMC. prereq: Approval of Learning Abroad Center

FOST 3205. Study Abroad (Outside Program). (1-18 cr. [max 36 cr.] ; Student Option; Every Fall, Spring & Summer)
Study abroad programs/courses reviewed by UMC but offered through an outside organization. prereq: Approval of Learning Abroad Center

General Agriculture (GNAG)

GNAG 1012. Introduction to Applied Agricultural Chemistry. (2 cr. ; Student Option; Every Fall)
Common chemical processes, their application to production agriculture. Application of pH in soil/feed systems. Dilution principles, units of weights/measures. Basic applied theories used in agriculture. prereq: CHEM 1001 or [concurrent enrollment in CHEM 1001, instructor consent]

GNAG 1803. Directed Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Current topics not covered in regularly offered courses. prereq: Instructor consent

GNAG 2203. Ag Products and Processing. (3 cr. ; Student Option; Spring Odd Year)
Survey of raw agricultural products produced in Upper Midwest. Transport, processing, packaging, wholesale/retail distribution and sales. Quality factors, food laws/regulations, sanitation, food safety, environmental concerns. prereq: instructor's consent

GNAG 2204. International Agriculture Production, Processing and Marketing. (3 cr. ; Student Option; Spring Even Year)
Survey of international agricultural production. Transport, processing, packaging, wholesale/ retail distribution, marketing. Quality factors, food laws/regulations, sanitation, food safety, and environmental concerns. prereq: instructor's consent

GNAG 2899. Pre-Internship Seminar. (0.5 cr. ; A-F or Audit; Every Fall)
Expectations/responsibilities of internships. Preparing for a job search. Presentations about internship experiences by those who have recently completed 3900. Discussions between students, staff, and invited guests.

GNAG 3000. Global Seminar in Agriculture and/or Natural Resources. (1-3 cr. [max 6 cr.] ; Student Option; Periodic Spring)
Interdisciplinary approach to specific culture and its local/global issues as it relates to agriculture or natural resources. International experience in discipline of student's choice. Course offered on demand. Led by faculty member.

GNAG 3203. Ag Products and Processing. (3 cr. ; Student Option; Spring Odd Year)
Survey of raw agricultural products produced in Upper Midwest. Transport, processing, packaging, wholesale/retail distribution and sales. Quality factors, food laws/regulations, sanitation, food safety, environmental concerns. prereq: Jr

GNAG 3204. International Agricultural Production, Processing, and Marketing. (3 cr. ; Student Option; Spring Even Year)
Survey of international agricultural production. Transport, processing, packaging, wholesale/ retail distribution, marketing. Quality factors, food laws/regulations, sanitation, food safety, and environmental concerns.

GNAG 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

GNAG 3899. Pre-Internship Seminar. (0.5 cr. ; A-F or Audit; Every Fall)
Expectations/responsibilities of internships. Preparing for a job search. Presentations about internship experiences by those who have recently completed 3900. Discussions between students, staff, and invited guests.

GNAG 3900. Internship. (; 0.5-3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Supervised professional work experience in agricultural business, governmental agency. Report/consultation with faculty advisor/ employer. prereq: 3899, [soph or sr]

GNAG 3901. Post Internship Seminar. (0.5 cr. ; A-F or Audit; Every Fall)
Student who have recently completed internships prepare/deliver a PowerPoint presentation of experience/knowledge gained. Discussions between post/pre-internship students, staff, and invited guests. prereq: GnAg 3900

GNAG 4652. Senior Seminar. (1 cr. ; A-F only; Every Fall & Spring)
Survey of current literature. Preparation/ delivery of special topics. Preparation of abstracts, papers, and visual aids. Evaluation of seminars. Use of library and other resources, including computer information search. Use of new technology. prereq: Sr or instructor consent

General Business (GBUS)

GBUS 1005. Orientation to Online Learning. (; 1 cr. ; Student Option; Every Fall, Spring & Summer)
Introduction to UMC policies, e-mail, virtual private network, online library resources, writing scholarly reports, APA referencing,

netiquette, networking in online environment, group work in online environment.

GBUS 1007. Enactus. (1 cr. ; S-N only; Every Fall & Spring)
Designed to award one academic credit to students who join/contribute to UMC Enactus Team. Students expected to demonstrate effective communication, teamwork, project management, leadership skills as they participate in developing/implementing projects.

GBUS 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Current topics not covered in regularly offered courses. prereq: Instructor consent

GBUS 1981. Career Development. (; 1 cr. ; Student Option; Every Spring)
Planning for securing/successfully completing internship. Internship policies/objectives. Samples of forms.

GBUS 3107. Legal Environment in Business. (; 3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Fundamental concepts of business law, with emphasis on legal system, contracts, bailments, agency, business organizations, fundamentals of commercial law.

GBUS 3117. Business Law. (; 3 cr. ; Student Option; Spring Even Year)
Negotiable instruments, bank deposits/ collection, bankruptcy, suretyship, partnerships, corporations, federal securities law, accountant's legal liability, property, insurance, trust, estates. prereq: 3107

GBUS 3190. Topics in Business. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
May include varied emerging topics in business.

GBUS 3300. Business Analytics. (; 3 cr. ; Student Option; Spring Odd Year)
Concepts, procedures, and technologies used by managers, administrators, and employees to enhance operation of an organization. Use of data mining and analysis to improve decision strategies. prereq: MATH 1150

GBUS 3500. Business Ethics. (; 3 cr. ; Student Option; Every Fall & Spring)
Ethics as compelling responsibility of today's business organizations. Moral principles/ models for ethical decision making. Challenges of ethical business practices. prereq: Mgmt 3200 and Mktg 3300 or instructor consent

GBUS 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

GBUS 3855. Special Topics in Business. (; 1-3 cr. [max 6 cr.] ; Student Option; Periodic Fall, Spring & Summer)
Topics for in-depth discussion which will cover issues in accounting, economics, finance, management, marketing, or sport and recreation.

General Education (GNED)

GNED 1000. Seminar for New Students. (2 cr. ; Student Option; Every Fall & Spring)
Assists students in transition from high school to college-level academics. Interactive environment. Knowledge and strategy skills for academic success. prereq: Recommended for first semester on campus

GNED 1505. Peer Tutor Certification Level 1. (; 1 cr. ; Student Option; Every Spring)
Provides a theoretical background useful to systematic and effective tutoring, session planning, and learning group facilitation. prereq: must be approved for hire by the Academic Success Center as a peer tutor

GNED 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Current topics not covered in regularly offered courses. prereq: Instructor consent

GNED 1900. Chancellor's Academic Success Seminar. (0.5 cr. ; Student Option; Every Fall & Spring)
Comprehensive study program to help strengthen learning skills. Includes some monitoring of contract requirements. prereq: Student must be on academic contract

GNED 2000. Global Study. (GLOB PERSP,HUMANITIES; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Interdisciplinary approach to a specific culture and its current local/global issues. May require international travel for one to three weeks, led by a faculty member.

GNED 3000. Global Seminar. (GLOB PERSP,HUMANITIES; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Interdisciplinary approach to a specific culture and its current local/global issues. In-depth experiences in a discipline area of student's choice. May require international travel for one to three weeks, led by a faculty member.

GNED 3804. Individual Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

GNED 3809. Teaching and Learning Assistance. (1 cr. [max 4 cr.] ; Student Option; Periodic Fall & Spring)
Skills/techniques in disciplinary content associated with college teaching. Supervised by faculty monitor and site supervisor. prereq: Jr, instructor consent, minimum GPA 3.00 in subject matter

General Math, Sci and Techn (GMST)

GMST 2000. International Travel Experience. (GLOB PERSP; 1-3 cr. [max 6 cr.] ; Student Option; Periodic Fall, Spring & Summer)
Explore a math, science, and/or technology topic in relation to a specific culture and its current/local global issues. May require international travel for one to three week led by faculty member.

GMST 3000. International Travel Experience. (GLOB PERSP; 1-3 cr. [max 6 cr.] ; Student Option; Periodic Fall, Spring & Summer)
Explore a math, science and/or technology topic in relation to a specific culture and its current local/global issues. In-depth experiences in a discipline area of student's choice. May require international travel from one to three weeks led by a faculty member.

Geography (GEOG)

GEOG 1104. World Regional Geography. (GLOB PERSP,HI/BEH/SSC; 3 cr. ; Student Option; Periodic Fall)
Theme of socioeconomic development used to organize geographic concepts for major regions of world. Geographic perspective in study of cultures, development, and human-environment interaction. Who has what, where, and how.

Geology (GEOL)

GEOL 1001. Introductory Geology. (PEOPLE/ENV,PHYS SCI; 3 cr. ; A-F or Audit; Every Fall & Spring)
Survey of Earth, including its composition, structure, and dynamics; internal and surface processes related to theories of sea floor and continental movement; summary of geological history and development of life. Lab.

Health (HLTH)

HLTH 1062. First Aid and CPR. (; 2 cr. ; Student Option; Every Fall & Spring)
American Red Cross course that follows guidelines set by the ARC and UMC for certification and grading. Prepares students to carry out the Emergency Action Principles and grants certification in Responding to Emergencies (an inclusive first aid and CPR course) if the ARC standards are successfully met.

Health Informatics (HI)

HI 2060. Database Management in Health Information Systems. (; 3 cr. ; Student Option; Every Fall)
Fundamentals of health information database design and development. Common aspects of many health information database management systems. How to write business rules; model and implement databases; and write transactions. Database mechanisms that aid in securing data.

HI 3020. Introduction to Health Information Systems. (; 3 cr. ; Student Option; Every Fall & Spring)
Information systems applied to the health care industry. How information is collected, stored, retrieved, shared, and analyzed, along with the legal and ethical concerns inherent in the stewardship of patient information. Work flow, electronic health records, and personal health records.

HI 3060. Secure Data Collection and Retrieval. (; 3 cr. ; Student Option; Every Spring)
Data manipulation in health care industry. Secure data collection techniques/tools. Data encoding. Resolving data conflicts. Data cleaning. Decision support systems. Data evolution. Data measures. Secure data retrieval techniques. Reporting applications. Data analysis techniques. prereq: 2060 or SE 3050

HI 3100. Health Information Workflow Process Analysis and Design. (; 3 cr. ; Student Option; Every Spring)
Workflow processes in the health organizations. How to model workflows using formal/semi-formal diagramming notations. How processes can change over time/strategies for managing change. Information architectures, workflow components; interoperability in service oriented architectures. prereq: 3020

HI 3200. Social, Legal, Ethical Issues in Health Informatics. (; 3 cr. ; Student Option; Every Fall)
Social, legal, and ethical issues associated with collection, using, sharing, and stewardship of electronic medical records. Responsibilities of and impacts on health information professionals and health organizations. Social impacts of meaningful use of electronic medical records.

HI 3215. Health Information Assurance and Security. (; 3 cr. ; Student Option; Every Spring)
Information assurance as it relates to legal responsibilities, including HIPAA, Sarbanes-Oxley, HITECH, and Digital Rights Management. Strategies and process models for securing information. Information assurance and security industry standards such as ISO 17799 and COBIT. Use of software tools to aid in protecting data.

HI 3300. Organization of EHR Systems. (; 3 cr. ; Student Option; Every Spring)
Architectures, organization, data structures and features. Analysis and design patterns. Nonfunctional requirements and solutions. Constraints of EHR systems development such as security, interoperability, government, and certification. Application of XML, XMI, SOA, and RM-ODP.

Health Science (HSCI)

HSCI 1072. Wellness. (3 cr. ; Student Option; Every Fall)
Students develop a personal wellness plan.

HSCI 1123. Fundamentals of Nutrition. (BIOL SCI; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Fundamentals of nutrition and metabolism, including carbohydrates, proteins, fats, minerals, vitamins, and water. Assessment of health risks, health promotion, and disease prevention.

HSCI 1201. Introduction to Exercise Science. (2 cr. ; Student Option; Every Spring)
This course will educate students about the important aspects of exercise science and wellness, including history, areas of study, technology, career opportunities, certifications, professional organizations, and future trends. Details of the exercise science and wellness curriculum will also be explored.

HSCI 2650. Stress Management. (; 3 cr. ; Student Option; Every Spring & Summer)
This course is designed to help students understand the physiology of stress and its relationship with disease. Students will explore various coping strategies, and stress management techniques to aid them in dealing with their own personal stress as well as use such techniques and strategies to assist others in stress management.

HSCI 2994. Introductory Undergraduate Research. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Intermediate independent work in special fields. prereq: instructor's consent

HSCI 3001. Community Health and Wellness. (3 cr. ; Student Option; Spring Even Year)
Health/wellness education in community settings. Topics include behavior change, education and counseling theory, needs assessment, planning, implementation, and evaluation in a community setting. prereq: 1072, Biol 2104, or instructor consent

HSCI 3112. Kinesiology. (4 cr. ; Student Option; Every Spring)
Introduction to the various fields of human movement; exposure to concepts, definitions and fundamental principles in the disciplines of biomechanics, exercise physiology, sport psychology and psychomotor learning used for understanding human movement. Lab. prereq: Biol 2104 or instructor consent

HSCI 3804. Individual Studies. (1-3 cr. ; Student Option; Every Fall, Spring & Summer)
Individualized study related to student's interest in health care topic not covered in regular courses. prereq: instructor consent

HSCI 3899. Pre-Internship Seminar. (0.5 cr. ; Student Option; Every Spring)
Expectations/responsibilities of internship. Preparing for graduate or professional school application or a job search. Presentations about internship experiences by those who have recently completed 3900 (internship). Discussions between students, staff, and invited guests.

HSCI 3900. Internship. (1-2 cr. ; Student Option; Every Fall, Spring & Summer)
Supervised professional work experience in health care facility. Report/consultation with faculty adviser/employer. prereq: 3899, instructor consent

HSCI 3901. Post-Internship Seminar. (0.5 cr. ; Student Option; Every Spring)
Students who have recently completed internships prepare/deliver a PowerPoint presentation of experience/knowledge gained. Discussions between post/pre-internship students, staff, and invited guests. prereq: 3900

HSCI 3994. Undergraduate Research. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Advanced independent work in special fields.

HSCI 4301. Capstone: Problem Solving in Health Care Teams. (1 cr. ; Student Option; Spring Even Year)
Interdisciplinary approaches to patient care and public health issues. Case studies.

HSCI 4520. Exercise Testing and Prescription. (3 cr. [max 4 cr.] ; Student Option; Every Spring)
Examine techniques used to test/evaluate all components of fitness; including cardiorespiratory fitness, muscular fitness, body composition, and muscular flexibility. Stress management techniques introduced. Guidelines to prescribe exercise based on fitness evaluations/practical use of relevant equipment. prereq: Biol 3520

HSCI 4650. Advanced Concepts of Strength and Conditioning. (3 cr. ; Student Option; Every Fall)
This course will provide the skills necessary for proper selection, administration, and interpretation of strength and conditioning practices. Students will learn to apply evidence-based training methods and strategies designed to reduce injury while optimizing individualized performance and fitness across various demographics. prereq: 3112, 4520

HSCI 4720. Exercise and Wellness for Special Populations. (3 cr. ; Student Option; Every Fall)
This course will examine exercise programming strategies and precautions for people in various life stages such as children, elderly, and pregnant women as well as those with chronic disease. Pathophysiology and exercise as a management strategy will be discussed for those with metabolic, cardiorespiratory, and musculoskeletal diseases and disorders. prereq: 4520

Health Systems Management (HSM)

HSM 1010. Medical Terminology. (; 2 cr. ; Student Option; Every Fall & Spring)
Prefixes, suffixes, and roots used to compose medical terms. Pronouncing and defining terminology related to body structure, disease, diagnosis, and treatment.

HSM 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Current topics not covered in regularly offered courses. prereq: Instructor consent

HSM 2010. Introduction to the Health Care System. (; 2 cr. ; A-F or Audit; Every Fall & Spring)
Major developments in evolution of health care in United States. Education/training of health care personnel. Service providers. Public, private, voluntary agency initiatives. Major stakeholders. Rural/urban priorities.

HSM 3030. Health Care and Medical Needs. (; 3 cr. ; Student Option; Every Fall & Spring)

Common health conditions, diseases, disabilities. Intervention/treatment issues. Health care/medical needs across age continuum. Medical/pharmacologic terminology. prereq: 1010

HSM 3200. Health Care Leadership and Planning. (; 4 cr. ; Student Option; Every Fall & Spring)
Organizational management characteristics for modern health care settings. Management process/roles addressing resource allocation, delivery of clinical services, governance, patient satisfaction, outcome evaluation. prereq: 2010 or 38 or more occupational credits

HSM 3230. Administration of the Long Term Care System. (; 3 cr. ; Student Option; Every Fall & Spring)
Programs/services to meet needs of aging population. Physical, social, psychological aspects of aging. Role, organization, function, management characteristics of long-term health care facilities. Administrative structures, staffing, changing work force. Governance, operations oversight.

HSM 3240. Health Care Policy and Comparative Systems. (; 4 cr. ; Student Option; Every Fall & Spring)
Analysis/comparison of world health problems/ delivery systems. Geographic, political, economic relationships affecting health care system. prereq: 3200, Comp 1013

HSM 3250. Performance Improvement in Health Care. (; 3 cr. ; Student Option; Every Fall & Spring)
Problems in U.S. health care system (access, quality, cost). How application of performance improvement principles/methods can add value to health care. prereq: 3200

HSM 3260. Risk Management in Health Care. (; 3 cr. ; Student Option; Every Fall & Spring)
How risk management can improve patient safety, customer satisfaction, quality of care, decrease liability in health care. prereq: 3200

HSM 3270. Health Care Finance. (; 3 cr. ; Student Option; Every Fall & Spring)
Finance structure of U.S. health care system. Reimbursement mechanisms. Financial information in management decision making. Financial planning/control. Analysis of financial statements/budgets in health care system. prereq: Acct 2101, CA 1020

HSM 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

HSM 3900. Internship. (1-5 cr. ; Student Option; Every Fall, Spring & Summer)
Ten-week field experience under direction of a faculty member in a health care organization or agency. Students complete agency/ organization assessment and major project. prereq: 3200, 3230, 4210, 4212, instructor consent, internship plan approved by HSM program director; may be repeated in different health care setting

HSM 4210. Health Care Law and Biomedical Ethics. (; 4 cr. ; Student Option; Every Fall & Spring)
Legal/bioethical issues in health care management. Professional licensing, certification, reporting. Liability, negligence, malpractice. Patient rights/responsibilities. Clinical outcomes assessment/measurement. prereq: 3200

HSM 4212. Regulatory Management. (; 3 cr. ; Student Option; Every Spring & Summer)
Health care funding/reimbursement processes. Compliance/regulatory mechanisms. Federal/ state surveys. prereq: 3200

HSM 4215. Medical Practice Management. (; 3 cr. ; Student Option; Every Fall & Spring)
Introduce students to the management of outpatient and clinic practices; educate students on the types of healthcare coverage, reimbursements, value-based purchasing, revenue cycle management, project management and the many dimensions of a medical practice. Prereq: 3250, 4212, Acct 2101

HSM 4500. Decision Making in Health Management. (; 3 cr. ; Student Option; Every Fall & Spring)
Methodologies/concepts required to plan/ execute manage projects within health care settings. Use of evidence based research/data in the decision making process. Implementing and evaluating change within organizations. Prerequisites: HSM 3230, 4210, 4212

HSM 4600. Capstone Course in Health Management. (; 3 cr. ; Student Option; Every Spring & Summer)
Field experience under direction of a faculty member in a health care organization/agency. Students complete organization assessment/ applied projects within health care settings. Methodology of this project will be based on evidence based practices/research in the field of Health Management. Prerequisite: HSM 4500

History (HIST)

HIST 1021. World Civilization I. (GLOB PERSP; 3 cr. ; Student Option; Every Fall & Spring)
Ancient Near East, Greece, Egypt, Rome, and Medieval Europe.

HIST 1022. World Civilization II. (GLOB PERSP; 3 cr. ; Student Option; Every Fall & Spring)
Renaissance and Modern Europe from Reformation to present.

HIST 1301. American History I. (HI/BEH/ SSC; 3 cr. ; Student Option; Every Fall)
Colonial era and early national period from the Revolution through the Civil War and Reconstruction.

HIST 1302. American History II. (HI/BEH/ SSC; 3 cr. ; Student Option; Every Fall & Spring)
Gilded Age to present with emphasis on foreign involvements and wars, New Deal, civil rights, and economic developments.

HIST 3054. Topics in History. (; 3 cr. [max 6 cr.] ; Student Option; Periodic Fall & Spring)
Topics of regional, national, or international importance, such as Minnesota history, U.S. Civil War, Japanese history.

Honors (HON)

HON 1010. Honors Symposium. (; 2 cr. ; Student Option; Every Fall & Spring)
Foundation for honors program. Independent thinking, writing, discussion, leadership, research skills within a global perspective. Critical thinking skills will be emphasized throughout the course. prereq: Admitted to honors or approval of instructor

HON 3000. Global Leadership Seminar. (; 3 cr. [max 6 cr.] ; Student Option; Periodic Spring)
Interdisciplinary approach to current local/ global issues. Leadership development in foreign location. International travel for 3 to 4 weeks. Presentation to campus community. prereq: Instructor consent

HON 3010. Honors Option. (1 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Students work with faculty member to develop extracurricular activity/project conducted concurrently with regular coursework. Coursework beyond scope of regular course. prereq: 1010, instructor consent

HON 3030. Honors Contract. (1 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Students work with faculty sponsor to organize group that discusses common reading. Students encouraged to take advantage of colloquia offered on campus. prereq: 1010, instructor consent

HON 3994. Undergraduate Research. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Advanced independent work in special fields.

HON 4010. Proposal for Honors Essay, Research, or Creative Project. (1 cr. ; Student Option; Every Fall & Spring)
Frequent meetings with academic adviser and director of honors to develop honors project proposal to fulfill final honors program requirements. prereq: 1010, consent of [project adviser, director of honors]

HON 4030. Honors Essay, Research, or Creative Project. (3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Guides student through process of research/ preparation of documentation for dissemination at public defense. Discipline-specific work supervised by adviser to develop an original essay, research, or creative project. prereq: 4010, approval of [departmental head, director of honors]

Horticulture (HORT)

HORT 1010. Introduction to Horticulture. (3 cr. ; Student Option; Every Fall & Spring)
Environmental considerations, planting, propagation, pruning, and protection

of horticultural crops. Greenhouse/field experience.

HORT 1021. Woody Plant Materials. (4 cr. ; A-F or Audit; Every Fall)
Identification, ecology, and use of deciduous and evergreen trees, shrubs, and vines. prereq: 1010 or instructor consent

HORT 1025. Introduction to Arboriculture. (2 cr. ; Student Option; Every Fall)
Applications in arboriculture. Tree biology, tree/soil/water relations, planting, pruning, worker safety, trees/urban interfaces, electrical hazards, plant health care, golf course tree maintenance. Climbing/felling techniques.

HORT 1091. Indoor Flowering and Foliage Plants. (2 cr. ; Student Option; Fall Odd Year)
Identification, culture, and propagation of foliage plants used in interior decoration.

HORT 1092. Floral Design. (2 cr. ; Student Option; Every Spring)
Principles for design related to floral arrangement, identification, use, and care of cut flowers common to florist industry.

HORT 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topics not covered in regularly offered courses.

HORT 3025. Applications in Arboriculture. (3 cr. ; Student Option; Every Fall)
Application of knowledge/techniques learned in introduction course. Students perform climbing, tree pruning, rigging applications, and tree felling. Safe work practices. Advanced pruning, fruit tree care. Disease/pest identification/ management, cabling/bracing, lightning protection. prereq: 1025

HORT 3030. Landscape Design. (4 cr. ; A-F only; Every Spring)
Application of aesthetic, environmental, and functional design principles to creative planning/development of residential/ commercial landscapes. Emphasizes low impact and sustainability. prereq: 1021

HORT 3031. Herbaceous Perennial Plant Materials. (2 cr. ; Student Option; Fall Odd Year)
Identification, classification, ecology, and landscape uses of perennial flowers, bulbs, ground covers, and wildflowers.

HORT 3033. Commercial Floriculture Crops-Fall. (4 cr. ; Student Option; Every Fall)
Identification and culture of holiday pot plants and major cut flower crops. Soil preparation, artificial mixes, soil testing, applying soil test results; greenhouse pests, life cycle, control and management. prereq: 1010

HORT 3034. Commercial Floriculture Crops-Spring. (4 cr. ; Student Option; Every Spring)
Fundamentals of greenhouse structure and management. Heating and cooling requirements, lighting photoperiod control, soil sterilization, production of winter grown greenhouse crops such as mums, azaleas, cineraria. Identification and culture of annual bedding plants. Wholesale production, use of annual flowers in residential and commercial landscape design. prereq: 1010

HORT 3036. Plant Propagation. (4 cr. ; Student Option; Every Spring)
Plant propagation techniques for the commercial and home propagator. Mist system construction and operation. Propagation of plants by tissue culture, seed, cutting, layering, grafting, and division. prereq: 1010, Biol 2022

HORT 3040. Landscape Installation and Maintenance. (3 cr. ; Student Option; Every Fall)
Applied horticulture practices in planting landscape materials, installing hardscapes, and maintaining residential/commercial landscapes. Proper use/maintenance of equipment. Emphasizes environmental/sustainability considerations.

HORT 3045. Urban Forestry Planning and Management. (3 cr. ; Student Option; Every Spring)
Tree management for municipal forester. Tree planning/planting for city streets. Right of way pruning, management techniques, electrical hazard awareness, risk assessment/removals. Research papers, group exercises. prereq: 3025

HORT 3090. Advanced Landscape Design. (3 cr. ; Student Option; Every Fall)
Application of aesthetic, environmental, functional design principles to creative planning/development of commercial, interior, parklands, residential landscapes. Create computer generated designs using Auto CAD, SketchUp/other current design programs. prereq: 3030

HORT 3093. Advanced Floral Design and Florist Operations. (2 cr. ; Student Option; Fall Even Year)
Advanced floral design. Management/business issues unique to floral industry. prereq: 1092

HORT 3804. Individual Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topics related to student's major not covered in regularly offered courses.

Humanities (HUM)

HUM 1301. Introduction to Humanities. (HUMANITIES; 3 cr. ; Student Option; Every Fall & Spring)
The arts as a reflection of our search for understanding of the human condition. Beliefs and attitudes presented through creative expressions from around the world.

HUM 3310. Culture and Technology. (GLOB PERSP,HUMANITIES; 3 cr. ; Student Option; Every Fall & Spring)
Analysis of historical and cultural factors shaping technology. Synthesis of integrated relationships among technology, the arts, societal practices, and values.

Information Technology Mgmt (ITM)

ITM 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Current topics not covered in regularly offered courses. prereq: Instructor consent

ITM 2994. Introductory Undergraduate Research. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Intermediate independent work in special fields. prereq: instructor's consent

ITM 3020. Introduction to Management Information Systems. (; 3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Theoretical background/hands-on experience with "software as service" applications. Traditional individual/company hosted software.

ITM 3110. Microcomputer Operating Systems. (; 3 cr. ; A-F or Audit; Every Spring)
Introduction to operating system concepts. Windows, Unix, Linux OS are discussed. Topics addressed include the purpose and uses of an operating system, resource management (e.g., memory, processes, I/ O, and files), control language, shells, script. prereq: SE 2100

ITM 3130. Messaging Systems. (; 3 cr. ; Student Option; Every Fall)
Unified messaging types such as electronic mail, fax, voice. Server software such as Microsoft Exchange, IBM Notes, Novell Groupwise. Internet standards for messaging. prereq: 3110

ITM 3190. Topics in Information Technology Management. (; 3 cr. [max 9 cr.] ; Student Option; Every Fall & Spring)
Topics may include cold fusion, asp, net, other emerging platforms. prereq: SE 2050, SE 3050

ITM 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; A-F or Audit; Every Fall, Spring & Summer)
Topic related to student's major, not covered in regularly offered courses. prereq: Jr, instructor consent

ITM 3900. Internship. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Supervised experience in an information or networking entity within a business firm or agency. Reports/consultations with faculty advisers and employers. prereq: Jr or instructor consent

ITM 3994. Undergraduate Research. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Advanced independent work in special fields. prereq: instructor's consent

ITM 4020. Analysis and Design of Information Systems. (; 3 cr. ; Student Option; Every Fall)
Systems development life cycle. Needs assessment, hierarchical diagramming, entity-relationships, data-flow diagramming. Project-focused review. prereq: 3110, SE 2050, SE 3050

ITM 4900. Senior Project in Information Technology Management. (; 3 cr. ; Student Option; Every Spring)
Students complete an extensive IT design/ development project under guidance of faculty member and present the project to ITM faculty and senior peers. prereq: Sr

International Business (IBUS)

IBUS 2010. International Dimensions in Business and Culture. (GLOB PERSP; 3 cr. ; Student Option; Every Spring)
Skills to interact successfully in various settings in Europe, Africa, North and South America, Asia. Standards/practices of indigenous organizations, governments, and cultures in global context. Multinational interaction, communication, and cooperation.

IBUS 3010. International Business Law. (; 3 cr. ; Student Option; Every Fall)
Law for business transactions in global political legal environments. Laws of different countries/legal effects on individuals/business organizations. Agreements, international contracts/administrations, exports/import, technology transfers, regional transactions, intellectual property, product liability, legal organization.

IBUS 3020. International Financial Management. (; 3 cr. ; Student Option; Fall Odd Year)
International financial markets with risks/ benefits of international operations. Compare operation of global companies with domestic companies regarding foreign exchange fluctuations, political risks, financial tools to address risks, capital budgeting, tax, working capital structure, investment decisions, company's valuation.

IBUS 3201. Study Abroad in International Business. (1-6 cr. ; Student Option; Every Fall, Spring & Summer)
Taken in conjunction with focused international visit, or as connection to cooperative learning experience at accredited higher education institution abroad.

IBUS 3360. International Marketing. (; 3 cr. ; Student Option; Every Spring)
Factors affecting marketing of goods/services. Managing organization in international environment. Complete team marketing plan for product being marketed internationally. prereq: MGMT 3200, MKTG 3300

IBUS 3500. International Business Management. (; 3 cr. ; Student Option; Every Spring)
Principles, opportunities, challenges of managing international business. Basic managerial functions. Economic, social, political environment. prereq: MGMT 3200

IBUS 3900. Field Experience in International Business. (1-6 cr. ; Student Option; Every Fall, Spring & Summer)
Employed as interns in international business firm, institution, or agency. Experience must have global component but may be completed either domestically or at international location. Reports/consultations with faculty/employers required.

IBUS 4800. Senior Seminar in International Business Strategy. (; 3 cr. ; Student Option; Every Spring)
Topics include gains from trade, costs of trade, competitive strategy of international business. Consider alternative modes of market entry, including import/export through intermediaries, contracting with suppliers/distributors, strategic alliances/foreign direct investment.

Management (MGMT)

MGMT 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Current topics not covered in regularly offered courses. prereq: Instructor consent

MGMT 3200. Principles of Management. (3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Terminology, theories, concepts, and skills of managing. Basic functions of managing including, planning, organizing, leading, and controlling. Additional topics include decision making, business ethics, and social responsibility. prereq: Psy 1001 or instructor consent

MGMT 3210. Supervision and Leadership. (; 3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Emphasis on organizational environment/ human behavior. Human resource systems, motivating employees, leadership, managing change, job satisfaction, communication, group processes, interpersonal/group dynamics within organization.

MGMT 3215. Organizational Behavior. (; 3 cr. ; Student Option; Every Spring)
Foundational understanding of people at work. Organizational behavior/business cultures. Social sciences of psychology, sociology, anthropology at work in organization. Address topics of organizational design, work relationships, leadership, communications, motivation/team building. prereq: 3200

MGMT 3220. Human Resource Management. (; 3 cr. ; A-F or Audit; Every Fall)
Management of people at work. Recruitment, selection, training, compensation, evaluation. Changing nature of world of work, labor market, labor relations, emerging legal issues, discrimination in pay and employment, effects of technological change on jobs/employment performance. prereq: Mgmt 3200

MGMT 3250. Operations Management. (; 3 cr. ; A-F or Audit; Every Fall)
Introduction to operations management concepts to transform inputs such as materials, labor, capital and management into outputs that satisfy customer demand. The course focuses on analytical techniques and critical thinking to enhance decision making and operations management excellence. prereq: [MGMT 3200, MATH 1150] or instructor consent

MGMT 3255. Logistics and Supply Chain Management. (; 3 cr. ; Student Option; Every Spring)
Examines supply chain management as a means of creating strategic competitive advantages. Logistical efficiency with environmental factors, strategic positioning, laws and policies, and cost maintenance will be examined.

MGMT 3270. Fundamentals of E-Business. (; 3 cr. ; Student Option; Every Fall & Spring)
The foundations of business information systems. Course will explore the technologies underlying a business information system and the functionality of internal and external communication platforms, Office, AIS, ERP, and CRM applications. prereq: 3200, MKTG 3300

MGMT 3600. Change, Creativity, and Innovation Management. (; 3 cr. ; Student Option; Every Fall)
The comprehensive study of organizing, planning, and evaluating innovation efforts in a dynamic business environment. Examination of ways to foster creativity and manage change in innovative organizations. prereq: [3200, MKTG 3300] or instructor consent

MGMT 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; A-F or Audit; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

MGMT 3900. Internship. (; 1-3 cr. ; Student Option; Every Fall, Spring & Summer)
Employed as interns in business firm, institution, or agency. Reports/consultations with faculty/employers required. prereq: Jr

MGMT 4200. Project Management. (; 3 cr. ; Student Option; Every Spring)
Foundations of project management. Working with teams, schedules, risks, and resources to produce a desired outcome. Skills and tools of project management with case studies and using appropriate software facilitate learning. prereq: 3200

MGMT 4800. Strategic Management. (; 3 cr. ; Student Option; Every Spring)
Examines strategic management concepts and challenges. Requires students to research, develop strategic alternatives, and make decisions for organizations represented in textbook cases and from current business events. prereq: 3200, Fin 3100, Mktg 3300

Marketing (MKTG)

MKTG 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Current topics not covered in regularly offered courses. prereq: Instructor consent

MKTG 2200. Personal Selling. (; 3 cr. ; A-F or Audit; Every Fall)
Introduction to selling principles/ processes. B2B vs B2C selling. Persuasive communication. Selling vs. buying. Time management. Emphasizes developing long-term buying/selling relationships.

MKTG 3230. Internet Marketing. (; 3 cr. ; Student Option; Every Spring)
Value of incorporating digital and interactive marketing of goods/services. Strategies for using Internet to leverage marketing mix (product, price, place, promotion) to meet marketing objectives. prereq: 3300

MKTG 3250. Integrated Marketing Communication. (; 3 cr. ; A-F or Audit; Every Fall)

Principles of integrated marketing communications (IMC) including broadcast media, print media, support media, direct marketing, Internet/interactive marketing, sales promotions, and public relations. Develop/present promotional campaign for company. prereq: 3200, 3300

MKTG 3300. Principles of Marketing. (; 3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Introduction to marketing/strategic marketing process. Team development of marketing plan that implements product, pricing, distribution, promotional strategies. prereq: [Econ 2101 or 2102], [Psy 1001 or instructor consent]

MKTG 3310. Consumer Behavior. (; 3 cr. ; A-F or Audit; Every Fall)
Fundamentals of consumer behavior. Behavior of individuals/groups. Social/environmental factors that influence buyer's purchase decision. Group projects outside classroom. prereq: 3300

MKTG 3400. Marketing Research. (; 3 cr. ; A-F or Audit; Every Fall)
Research process from marketing perspective. Problem formulation, scientific research methods, analysis/ interpretation of marketing data, research report writing, decision-making process derived from marketing research. prereq: Math 1150, Mktg 3300

MKTG 3700. Brand Management. (; 3 cr. ; Student Option; Every Spring)
Branding, building of brand equity. Brand differentiation. Leveraging brand in integrated marketing communications. Brand protection. Managing brand in competitive global environment. prereq: 3250, 3300, MGMT 3200

MKTG 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

MKTG 3900. Internship. (; 1-3 cr. ; A-F only; Every Fall, Spring & Summer)
Employed as interns in business firm, institution, or agency. Reports/consultations with faculty/employers required.

MKTG 4100. Retail Management. (; 3 cr. ; Student Option; Every Spring)
Marketing, inventory planning/control, merchandising, retail supply chain, promotions. Challenges/opportunities in competitive environment. Characteristics of successful retail managers. prereq: 3300

MKTG 4800. Marketing Strategies. (; 3 cr. ; A-F or Audit; Every Spring)
Analysis of marketing decisions, creative problem-solving exercises, presentation of case analyses/marketing plans. Individual/group projects. Students critique current marketing articles. Case studies, readings. prereq: [3310, 3400, final sem sr] or instructor consent

Mathematics (MATH)

MATH 1000. Algebra Lab. (1 cr. ; Student Option; Every Fall & Spring)
Supplemental instruction in algebra. Small group activities. prereq: concurrent enrollment in 1031, ACT Math score of 18-21

MATH 1031. College Algebra. (MATH THINK; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Basic algebraic operations, linear/quadratic equations/inequalities, variation. Functions/graphs. Theory of equations. Exponential/logarithmic functions. Systems of equations. Mathmatical modeling/applications. prereq: 0991 or ACT math score of 20 or higher

MATH 1142. Survey of Calculus. (MATH THINK; 3 cr. ; Student Option; Periodic Fall & Spring)
Derivatives, integrals, differential equations, maxima/minima, partial differentiation, applications. prereq: 1031 or ACT math score of 24 or higher

MATH 1150. Introduction to Statistics. (MATH THINK; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Descriptive statistics, elementary probability, normal distribution, binomial distribution, confidence intervals, tests of hypotheses, correlation, regression, chi-square, ANOVA. prereq: 0991 or ACT math score of 20 or higher

MATH 1250. Precalculus. (MATH THINK; 4 cr. ; Student Option; Every Fall)
Review of algebra, functions, polynomial, rational, exponential, logarithmic, trigonometric functions, trigonometric identities/equations, systems of equations, determinants/matrices, sequences/series, topics from analytic geometry. prereq: 1031 or ACT math score of 24 or higher

MATH 1271. Calculus I. (MATH THINK; 4 cr. ; Student Option; Every Spring)
Limits, differential calculus of functions of single variable, applications. Introduction to integral calculus of single variable. prereq: 1250 or ACT math score of 28 or higher

MATH 1272. Calculus II. (; 4 cr. ; Student Option; Every Fall)
Techniques of integration, calculus involving transcendental functions, polar coordinates, Taylor polynomials, vectors/curves in space, cylindrical/spherical coordinates. prereq: Math 1271

MATH 1803. Directed Studies. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Currents topics not covered in regularly offered courses.

MATH 2010. Discrete Mathematics. (3 cr. ; Student Option; Every Spring)
Designed to provide students with a background in abstraction, notation, and critical thinking in mathematics with applications related to computer science and software engineering. Topics include: logic, sets, relations, functions, proof techniques, mathematical induction, combinatorics, recursion, elementary number theory, and basic graph theory. prereq: 1250

MATH 2994. Introductory Undergraduate Research. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Intermediate independent work in special fields. prereq: 1031 and instructor's consent

MATH 3496. Special Topics in Mathematics. (; 1-4 cr. [max 8 cr.] ; Student Option; Every Fall & Spring)
Topics cover contemporary issues in mathematics. Recent/significant primary literature. Critical thinking.

MATH 3804. Individual Studies. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topic related to student's major not covered in regularly offered courses.

MATH 3994. Undergraduate Research. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Advanced independent work in special fields.

Medical Laboratory Science (MLS)

MLS 2234. Human Parasitology (UND). (; 2 cr. ; Student Option; Every Fall, Spring & Summer)
The course presents an overview of human parasitology emphasizing the basic academic and clinical knowledge utilized in a clinical laboratory. Fundamental knowledge of the geography, life cycle, laboratory diagnosis and clinical disease or pathology produced by human parasites will be discussed. prereq: Biol 1009H

MLS 3301. Immunology (UND). (; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Principles of clinical immunology/immunohematology including cellular/molecular nature of antigens and immunoglobulin, the immune response, immunogenetics, immune mediated disease, common blood group factors/antibodies, and compatibility testing.

MLS 3325. Hematology (UND). (; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Overview of clinical laboratory hematology with concentration on identification of normal and abnormal peripheral blood cells and their precursors in the bone marrow, principles of hematologic lab testing and a variety of lab testing results which aid in the diagnosis of a variety of hematologic conditions. prereq: Biol 1009H, 2103, 2104

MLS 3326. Hematology Laboratory (UND). (1 cr. ; Student Option; Every Summer)
Morphological examination of blood and marrow and laboratory testing used in hematological study. Intensive laboratory format on UND campus. prereq: Biol 1009H, 2103, 2104; co-requisite MLS 3325

MLS 3336. Laboratory Calculations (UND). (; 1 cr. ; Student Option; Every Fall)
Calculations used in the clinical laboratory including measurement systems, dilutions, graphing, solution chemistry, statistics of quality control and research interpretation. prereq: acceptance to the UND MLS program

MLS 3340. Molecular Diagnostics (UND). (; 2 cr. ; Student Option; Every Fall, Spring & Summer)
An overview of specific molecular biology application in the laboratory and a discussion

of cell biology, DNA chemistry, genetics, nuceic acid extraction and modification, blotting, polymerase chain reactions, and probes in relation to diagnostic investigations. prereq: Biol 1009H

MLS 3394. Medical Microbiology (UND). (; 2 cr. ; Student Option; Every Spring)
Medically important microorganisms are identified using a wide variety of clinical techniques. Included in this discussion will be susceptibility studies and the correlation of the presence of micro-organisms to health and disease. prereq: Biol 2032

MLS 4471. Clinical Chemistry I (UND). (2 cr. ; Student Option; Every Fall)
Theories and principles of clinical chemistry procedures are discussed as well as how the results of these procedures correlate to health and disease. Fall semester of final year at UND. prereq: Chem 2301, 3021, acceptance to the UND MLS program

MLS 4472. Pre-Analytical Testing Skills (UND). (1 cr. ; Student Option; Every Summer)
Theory and practice of phlebotomy in the clinical setting, specimen processing and handling, review of state and federal regulations, safety and biohazard compliance, interpersonal relationship skills and ethics. Summer semester at UND. prereq: acceptance to the UND MLS program

MLS 4473. Clinical Hemostasis I (UND). (; 2 cr. ; Student Option; Every Summer)
Physiological mechanisms of normal human hemostasis as well as hereditary and acquired bleeding and thrombotic defects are discussed. Laboratory techniques for obtaining blood, screening procedures, specific assays and procedures to monitor anticoagulant therapy. Summer semester at UND. prereq: acceptance to the UND MLS program

MLS 4474. Clinical Urinalysis I (UND). (2 cr. ; Student Option; Every Summer)
Theory, techniques and practice of routine urinalysis. Summer semester at UND. prereq: acceptance to the UND MLS program

MLS 4476. Clinical Immunohematology I (UND). (1 cr. ; Student Option; Every Summer)
Theory of modern transfusion techniques, component therapy and quality assurance. Summer semester at UND. prereq: concurrent enrollment in 4478; acceptance to the UND MLS program

MLS 4477. Clinical Immunohematology I Laboratory (UND). (1 cr. ; Student Option; Every Summer)
Practical application of modern transfusion techniques, component therapy, and quality assurance. Summer semester at UND. prereq: concurrent enrollment in 4476; acceptance to the UND MLS program

MLS 4478. Clinical Microbiology I (UND). (2 cr. ; Student Option; Every Summer)
Groups of medically important bacteria are studied and correlated to laboratory practice in identification. Included in the discussions are antibiotic susceptibility testing quality control, and methods of identification including rapid, automated and traditional methods. Summer semester at UND. prereq: acceptance to UND MLS program

MLS 4479. Clinical Hematology I (UND). (2 cr. ; Student Option; Every Summer)
Emphasis on hematology theory, the pathophysiology of disorders of the hematopoietic system, morphologic evaluation of blood smears, and interpretive correlation of hematology findings. Summer semester at UND. prereq: 3325, 3326 or equivalent; acceptance to the UND MLS program.

MLS 4480. Clinical Immunohematology II (UND). (2 cr. ; Student Option; Every Fall)
Applied theory/modern transfusion at the clinical affiliate. Fall semester of final year at UND. prereq: acceptance to the UND MLS program

MLS 4481. Clinical Chemistry II (UND). (2 cr. ; Student Option; Every Fall)
Applied theory and practice in clinical chemistry at the clinical affiliate. Fall semester of final year at UND. prereq: acceptance to the UND MLS program

MLS 4483. Clinical Hemostasis II (UND). (1 cr. ; Student Option; Every Fall)
Techniques and practice in routine phlebotomy and hemostasis at the clinical affiliate. Fall semester of final year at UND. prereq: acceptance to the UND MLS program

MLS 4484. Clinical Microbiology II (UND). (2 cr. ; Student Option; Every Fall)
Applied theory and practice in clinical microbiology at the clinical affiliate. Fall semester of final year at UND. prereq: acceptance to the UND MLS program

MLS 4485. Clinical Urinalysis II (UND). (1 cr. ; Student Option; Every Fall)
Applied theory and practice in urinalysis and observation, practice, or research in specialized areas or settings at the clinical affiliate. Fall semester of final year at UND. prereq: acceptance to the UND MLS program

MLS 4487. Medical Mycology (UND). (1 cr. ; Student Option; Every Summer)
Comparative mocrphology, physiology, and pathogenicity of medically important fungi. Laboratory methods for identification emphasize interpretation and evaluation of results including the recognition of contaminating organisms. Summer semester at UND. prereq: acceptance to the UND MLS program

MLS 4488. Clinical Hematology II (UND). (2 cr. ; Student Option; Every Fall)
Applied theory and practice in clinical hematology and the clinical affiliate. Fall semester of final year at UND. prereq: acceptance to the UND MLS program

MLS 4489. Clinical Body Fluids (UND). (1 cr. ; Student Option; Every Summer)
Overview of the theory and practice in manual procedures of human body fluids. The body fluids to be discussed include: spinal, synovial and amniotic fluid, transudates, and exudates, fecal specimens, gastric, sweat, and other body fluid secretions. Summer semester at UND. prereq: acceptance to the UND MLS program

MLS 4490. Financial and Quality Management of the Clinical Laboratory (UND). (; 3 cr. ; Student Option; Every Spring)
A capstone course designed to provide senior MLS students with the skills to manage a clinical laboratory. The course brings together previous content with a focus on laboratory profitability, quality management and quality improvement. prereq: acceptance to the UND MLS program

MLS 4491. Clinical Chemistry III (UND). (2 cr. ; Student Option; Every Spring)
Techniques and practice in clinical chemistry at the clinical affiliate. Spring semester of final year at UND. prereq: acceptance to the UNC MLS program

MLS 4492. Clinical Immunohematology III (UND). (2 cr. ; Student Option; Every Spring)
Techniques and modern transfusion practices at the clinical affiliate. Spring semester of final year at UND. prereq: acceptance to the UND MLS program

MLS 4494. Clinical Immunology (UND). (1 cr. ; Student Option; Every Spring)
Applied theory and practice in clinical immunology and serology at the clinical affiliate. Spring semester of final year at UND. prereq: acceptance to the UND MLS program

MLS 4495. Clinical Microbiology III (UND). (2 cr. ; Student Option; Every Spring)
Techniques and practice in clinical microbiology at the clinical affiliate. Spring semester of final year at UND. prereq: acceptance to the UND MLS program

MLS 4498. Clinical Hematology III (UND). (2 cr. ; Student Option; Every Spring)
Techniques and practice in clinical hematology and the clinical affiliate. Spring semester of final year at UND. prereq: acceptance to the UND MLS program

Music (MUS)

MUS 1011. University Singers. (HUMANITIES; 1 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Performing group provides experience in many areas of choral music.

MUS 1021. Introduction to Music. (HUMAN DIV,HUMANITIES; 3 cr. ; Student Option; Every Fall)
Music from Renaissance to present. Styles, forms, expressions. Some examples of music from various cultures compared with western art music.

MUS 1041. Private Music Instruction. (HUMANITIES; 1 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Individual music lessons in voice or instruments. One half-hour lesson per week.

MUS 1042. Private Instruction: Class Piano. (HUMANITIES; 1 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Study of piano technique/musicianship in classroom setting using multiple electronic

keyboards. Musical concepts, including melody, harmony, rhythm, repertoire.

MUS 1051. Student-Community Band. (HUMANITIES; 1 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Ensemble of musicians play brass, woodwind, percussion instruments at concerts on/off campus, at selected UMC athletic events.

MUS 1052. Jazz Band. (HUMANITIES; 1 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Students will rehearse, prepare, and perform appropriate literature of all styles and genres for jazz ensemble. The art of ensemble playing and improvisation is the primary focus of the course. Students will gain knowledge and insight of the stylistic differences in each era of jazz through varied literature. prereq: Audition required

MUS 1071. Musical Theater. (HUMANITIES; 1 cr. [max 6 cr.] ; Student Option; Every Spring)
Involvement in a musical theatre presentation. May include musical accompaniment, acting, singing, technical support.

MUS 1111. Elementary Music Theory. (HUMANITIES; 3 cr. ; Student Option; Every Spring)
Basic knowledge of rudimentary traditional chordal harmonies. Ear training through harmonic, melodic, and formal musical analysis. Beginning compositional exercises.

MUS 1803. Directed Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Music topics not covered in regularly offered courses. prereq: Instructor consent

MUS 3011. University Singers (Choir). (HUMANITIES; 1 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Performing group that provides experience in many areas of choral music. Students serve as section leaders, are required to review music to be rehearsed by ensemble before the music is "handed out." prereq: 1011, audition demonstrating skill in [sight-reading, accuracy of pitch, basic musicianship]

MUS 3027. Rock and Jazz Music Styles. (HUMAN DIV,HUMANITIES; 3 cr. ; Student Option; Spring & Summer Even Year)
Jazz/rock, tracing their roots from Europe/ Africa to being recognized as international popular music.

MUS 3028. Survey of American Musical Theater. (3 cr. ; Student Option; Spring Odd Year)
Mid-1800's through present. Composers, lyricists, plot synopses, other aspects.

MUS 3041. Private Instruction. (HUMANITIES; 1 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Advanced music instruction. prereq: Instructor consent

MUS 3042. Class Piano: Intermediate/ Advanced. (1 cr. ; Student Option; Every Fall & Spring)
Piano technique/musicianship. Classroom setting using multiple electronic keyboards. prereq: 1042, audition

MUS 3051. Student-Community Band. (1 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Students serve as section leaders, are required to review music to be rehearsed by ensemble before music is "handed out." prereq: audition

MUS 3052. Jazz Band. (HUMANITIES; 1 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Students will rehearse, prepare, and perform appropriate literature of all styles and genres for jazz ensemble. The art of ensemble playing and improvisation is the primary focus of the course. Students will gain knowledge and insight of the stylistic differences in each era of jazz through varied literature. prereq: 1052 and audition

MUS 3091. Instrumental and Choral Conducting. (2 cr. ; Student Option; Every Spring)
Conduct UMC ensembles to develop score reading skills, conducting techniques. prereq: At least 2 cr of Mus 1011 and/or 1051, instructor consent

MUS 3804. Individual Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topic related to student's minor not covered in regularly offered courses. prereq: Instructor consent

Natural Resources (NATR)

NATR 1226. Environmental Science and Sustainability. (BIOL SCI,PEOPLE/ENV; 3 cr. ; Student Option; Every Fall)
Interdisciplinary course. Applying ecological principles to social systems. Food/fiber production. Economic considerations of land use and rural communities. Pollution, global warming, energy production, biodiversity.

NATR 1233. Introduction to Natural Resources. (3 cr. ; A-F or Audit; Every Fall)
Survey of our natural resource heritage with emphasis on North America. Various fields within natural resources examined in terms of conservation practices, employment opportunities, and importance to sustainable societies.

NATR 1244. Elements of Forestry. (4 cr. ; A-F or Audit; Every Spring)
Forest management: ecology, silviculture, protection, and multiple-use decision-making processes. Woody forest plants: identification, growth requirements, and management techniques. Compass use and map reading. Survey of the lake states forest products industry. prereq: 1233

NATR 1663. Principles of Fisheries Management. (3 cr. ; A-F or Audit; Every Spring)
Fisheries management and fish species of Minnesota. Identification, ecology, population assessment, application of appropriate management techniques. prereq: 1233

NATR 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Current topics not covered in regularly offered courses. prereq: Instructor consent

NATR 2573. Entomology. (3 cr. ; A-F or Audit; Every Fall)
Insect taxonomy, anatomy, and physiology. Emphasis on insects of economic importance, especially in the Upper Midwest. Control methods, including integrated pest management. prereq: Hort 1010 or Agro 1183

NATR 2630. Introduction to Geographic Information Systems. (3 cr. ; Student Option; Every Fall & Spring)
Application/use of computer-based information systems, data delivery, and geographic information systems in natural resource management and regional planning. Labs focus on developing basic competence using current suite of ArcGIS software and finding, retrieving and utilizing data currently available from public resource management agencies. prereq: 1244, MATH 1031

NATR 2899. Pre-Internship Seminar. (0.5 cr. ; Student Option; Every Fall)
Expectations/responsibilities of internship. Preparing for a job search. Presentations about internship experiences by those who have recently completed internship. Discussion between students, staff and invited guests.

NATR 3203. Park and Recreation Management. (3 cr. ; A-F or Audit; Every Spring)
Survey of park and recreational area management. The recreationist; federal and state legislation; the roles of federal, state, local, and private sector recreation managers; and management techniques as they affect the private and public recreational area manager. prereq: NatR 1233

NATR 3296. Special Topics in Wildlife Management. (; 1-3 cr. [max 6 cr.] ; Student Option; Periodic Fall, Spring & Summer)
Offered on demand. Focused studies on wildlife-related topics. Seminars by students and guest speakers, field trips, global studies trips abroad. prereq: Sr or instructor consent

NATR 3297. Spec Topics in Water Resources. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Focused studies on water-related topics offered on demand. Seminars by students and guest speakers, field trips, global studies trips abroad. prereq: Sr or instructor consent

NATR 3344. Land Use Planning. (3 cr. ; Student Option; Every Spring)
Ecological, economic, and legal principles applied to land use planning in relation to agricultural, industrial, residential, wild land, forestry, recreational, and transportation needs. Legislative, agency, and citizen involvement in environmental law formulation and enforcement. Case studies. prereq: Jr or Sr status

NATR 3364. Plant Taxonomy. (3 cr. ; A-F or Audit; Every Spring)
Principles of plant taxonomy with emphasis on higher vascular plants of the Upper Midwest: family characteristics, floral structure, ecology, evolutionary relationships, values to human life, and importance as wildlife food and cover. Methods of field study and collection. prereq: Biol 2022 or instructor consent

NATR 3368. Land Management Field School. (1-4 cr. ; Student Option; Every Summer)
Intensive field-oriented program of study. Application of land management techniques in field situations. Guest lectures, field trips to natural resource agency projects. prereq: Junior or Senior status

NATR 3374. Ecology. (BIOL SCI; 4 cr. ; A-F or Audit; Every Fall)
Interactions among plants, animals, and the physical environment; structure and function of ecosystems; population dynamics, biotic communities; principles of biotic succession and ecosystem management. prereq: Biol 1009, Soil 1293

NATR 3376. Wetland and Riparian Ecology and Management. (3 cr. ; Student Option; Every Fall)
Ecology/management of wetland/riparian lands from global, continental, and Minnesota perspective. General ecology, structure/function, delineation, wetland plant identification, restoration/regulation programs. prereq: 3374

NATR 3464. Mammalogy. (3 cr. ; Student Option; Every Fall)
Classification, reproduction, physiology, behavior, ecological adaptations, zoogeography of mammals. Emphasizes techniques used in field/laboratory studies. prereq: Biol 2012

NATR 3466. Ornithology. (3 cr. ; Student Option; Every Spring)
Classification, reproduction, physiology, behavior, ecological adaptations, zoogeography of birds. Emphasizes techniques used in field/laboratory studies. prereq: Biol 2012

NATR 3468. Wildlife Habitat Management Techniques. (3 cr. ; Student Option; Every Fall)
Planning, ecological effects, application, monitoring of habitat management as used by conservation organizations: site preparation, planting, mowing, burning, grazing, herbicide use. Certification in prescribed burning, pesticide use. Wetland restoration, surface-mined land reclamation.

NATR 3480. Ecological Restoration. (3 cr. ; Student Option; Every Fall)
Principles of restoring/repairing disturbed/damaged ecosystems. Assessing site conditions, establishing reference criteria, determining restoration goals/objectives, manipulating successional trajectories, determining measures of successful restoration. prereq: 3374

NATR 3482. Minnesota Master Naturalist Volunteer Certification. (3 cr. [max 9 cr.] ; Student Option; Every Fall)
Promote awareness, understanding, respect of Minnesota's natural environment by developing corps of well-informed citizens dedicated to conservation education/service within communities.

NATR 3486. Conservation Biology. (; 3 cr. ; Student Option; Every Fall)
Science underlying methods of conservation of populations, species, ecosystems. Exploration of theory/practice of conservation within social, political, economic context of conservation problems. prereq: Biol 1009

NATR 3488. Invasive Species Ecology and Management. (3 cr. ; Student Option; Every Spring)
Identification, ecology, control/management of invasive plant/animal species in north central U.S. Characteristics of invasive species/ecological processes that occur when non-native species are introduced into new habitats. Pathways that have led to introduction/spread of invasives. prereq: 3374

NATR 3494. Special Topics in Forestry. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall)
Additional coverage of topics/field applications in forestry beyond the scope of NatR 1244. prereq: 1244

NATR 3495. Special Topics in Wilderness Management. (; 1-3 cr. [max 12 cr.] ; A-F or Audit; Every Spring)
Directed study offered once a year, with the following topics covered on a rotating basis: wilderness philosophy and ethic development, management of the wilderness resource, management of recreation resources, and wilderness management planning. Involves significant use of new communications technologies. prereq: NatR 3203

NATR 3496. Special Topics in Ecology and Conservation Biology. (; 1-3 cr. [max 9 cr.] ; Student Option; Every Fall & Spring)
Topics ecology and conservation biology. Recent/significant primary literature. Critical thinking/evaluation. Application to issues in ecological research. prereq: 3374

NATR 3520. Natural Resource Law Enforcement Techniques. (3 cr. ; Student Option; Spring Odd Year)
Survey of methods, procedures, and techniques in natural resource field law enforcement work. Natural resource case law. Applicable statutes pertaining to tenets of search/seizure, arrest, surveillance, and court system. prereq: 1233, CRJS 1500

NATR 3580. Advanced Ecological Restoration. (2 cr. ; Student Option; Every Spring)
Advanced topics in ecological restoration, including evaluation of case studies. Explore current advancements, topics/emerging issues in theory/practice of restoration. prereq: 3374, 3480

NATR 3635. Geographic Information Systems Applications. (3 cr. ; A-F or Audit; Every Fall)
Advanced principles/applications of geographic information systems. Nature/accuracy of geo-referenced data and methods of data capture, storage, retrieval, modeling, and digital map display. Includes semester-long lab project. prereq: 2630

NATR 3654. Wildlife Ecology and Management. (4 cr. ; A-F or Audit; Every Fall)
Application of ecological principles to studying and managing wildlife populations, with emphasis on habitat management. Management plan preparation. Field and lab techniques used by natural resource agencies. prereq: NatR 3374

NATR 3660. Prairie Ecosystem Management. (2 cr. ; A-F or Audit; Every Spring)
Description of prairie biome of North America, ecological relationships. Uses by native American, European peoples as setting for art/literature and as habitat for wildlife/livestock, management, restoration. Identification of prairie plants. prereq: NatR 3374

NATR 3699. Integrated Resource Management. (3 cr. ; A-F or Audit; Every Spring)
Team study exploring synthesis of environmental, technical, economic, political, and administrative principles as applied to case studies and current management situations. Emphasis on decision-making process. prereq: Sr or instructor consent

NATR 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

NATR 3899. Pre-Internship Seminar. (0.5 cr. ; Student Option; Every Fall)
Expectations/responsibilities of internship. Preparing for a job search. Presentations about internship experiences by those who have recently completed internship. Discussion between students, staff, and invited guests.

NATR 3900. Internship. (0.5-4 cr. ; Student Option; Every Fall, Spring & Summer)
Supervised professional work experience in natural resource agencies, private companies, and businesses. Report/consultation with faculty adviser/employer. prereq: 3899

NATR 3901. Post-Internship Seminar. (0.5 cr. ; Student Option; Every Fall)
Students who have recently completed internships, prepare/deliver a PowerPoint presentation of experience/knowledge gained. Discussions between post/pre-internship students, staff, and invited guests. prereq: 3900

NATR 3994. Undergraduate Research. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Advanced independent work in special fields. prereq: Instructor consent

NATR 4652. Seminar. (1 cr. ; A-F only; Every Fall & Spring)
Survey of current literature in horticulture, aviation, golf and turf, and natural resources. Preparation/delivery of special topics. Preparation of abstracts. Evaluation of seminars. Use of library and other resources, including computer information searches. prereq: Jr or sr

Networking and Telecommun (NT)

NT 3120. Networking Standards and Protocols. (; 3 cr. ; A-F or Audit; Every Fall)

Design, implementation, and management of an enterprise network. Servers, routers, bridges, gateways, transmission media, communications protocols, network security, performance tuning. prereq: ITM 3110

NT 3215. Information Assurance and Systems Security. (; 3 cr. ; Student Option; Every Spring)
Hacking culture. Impact of computer crime and Internet fraud. How a network/ systems administrator can design/implement countermeasures to defend/protect systems assets. prereq: 3120

Occupational Therapy (OT)

OT 1003. Orientation to Occupational Therapy (UMTC). (1 cr. ; S-N or Audit; Every Fall & Spring)
Survey of profession. Lectures, films, demonstrations, tours.

Philosophy (PHIL)

PHIL 1001. Introduction to Philosophy. (ETH/CIV RE,HUMANITIES; 3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Critical introduction to three fundamental questions of philosophy: What can I know? What can I believe? What ought I to do? Emphasis on developing ability to think, speak, and write critically.

PHIL 2002. Introduction to Ethics. (ETH/CIV RE,HUMANITIES; 3 cr. ; Student Option; Every Fall & Spring)
Foundational concepts of ethics. Applications in various contexts.

PHIL 3003. Applied Ethics. (; 3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Interdisciplinary examination of four areas of contemporary ethical concern: research ethics, agricultural ethics, business ethics, and biomedical ethics. prereq: 1001

Physical Education/Recreation (PER)

PER 1151. Golf. (1 cr. ; Student Option; Periodic Fall)
Introduction to and practice of the fundamentals of golf.

PER 1201. Dance (Folk, Social, Modern, Western). (1 cr. ; Student Option; Every Fall)
An alternative for aerobic activity. Acquaints students with dance and dance variety. Recreational dance course.

PER 1341. Court Activities. (1 cr. ; Student Option; Every Fall)
Introduce fundamental skills, rules/strategies of volleyball, racquetballl, tennis, and badminton. Progressing toward optimum ability. Achieving lifetime fitness.

PER 1451. Fitness for Better Health. (1 cr. [max 2 cr.] ; Student Option; Periodic Fall & Spring)
Individualized approach to designing and following through with a personalized fitness program. Exercise programs and activities in the fitness area. A form of wellness program, with emphasis on fitness.

PER 1461. Physical Training and Conditioning. (1 cr. ; Student Option; Every Fall & Spring)
Promotion and development of lifetime fitness through weight training and conditioning.

PER 1471. Olympic Weight Training. (1 cr. ; Student Option; Every Spring)
Techniques for advanced strengthening/ conditioning. prereq: PER 1461

PER 1481. Aerobic Exercise. (1 cr. [max 4 cr.] ; Student Option; Periodic Fall & Spring)
Promotes overall fitness. Incorporates aerobic movement for cardiovascular workout plus light weight training for strength and endurance. Stretching, flexibility, and relaxation.

PER 1601. Aquatic Activities (Beg Swim, Adv Beg, Intermediate, Swimmer, Lifeguard Trng/WSI, Aqua Aerobics). (; 1 cr. [max 4 cr.] ; Student Option; Every Spring)
Strokes, personal safety, and basic rescue skills in accordance with guidelines established by the American Red Cross.

PER 1690. Topics in Physical Education/ Recreation. (; 1 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topics in physical education or recreation vary.

PER 1701. Varsity Sports: Football. (1 cr. ; Student Option; Every Fall)
To study, practice, and participate in all individual and team skills of football.

PER 1711. Varsity Sports: Volleyball. (1 cr. ; Student Option; Every Fall)
Varsity collegiate volleyball experience.

PER 1712. Varsity Sports: Tennis (W). (1 cr. ; Student Option; Every Spring)
For students who wish to participate at the intercollegiate level.

PER 1714. Varsity Sports: Golf (W). (1 cr. ; Student Option; Every Fall)
Daily practice sessions, game competition. Evaluation based on satisfactory participation, completion of golf season.

PER 1716. Varsity Sports: Golf (M). (1 cr. ; Student Option; Every Fall)
Daily practice sessions, game competition. Evaluation based on satisfactory participation, completion of golf season.

PER 1722. Varsity Sports: Soccer (W). (1 cr. ; A-F or Audit; Every Fall)
Rules and basic strategies of soccer. Basic techniques of the major components of soccer. Appreciating and practicing the game of soccer.

PER 1731. Varsity Sports: Basketball (W). (1 cr. ; A-F or Audit; Every Spring)
Varsity collegiate basketball experience.

PER 1741. Varsity Sports: Basketball (M). (1 cr. ; A-F or Audit; Every Spring)
Varsity collegiate basketball experience.

PER 1761. Varsity Sports: Equestrian. (1 cr. ; Student Option; Every Spring)
Students participate/compete in equestrian events at collegiate level.

PER 1781. Varsity Sports: Softball (W). (1 cr. ; Student Option; Every Spring)
For athletes who wish to compete at the intercollegiate level.

PER 1791. Varsity Sports: Baseball (M). (1 cr. ; Student Option; Every Spring)
To practice, study, and participate in all individual and team skills of baseball.

Physics (PHYS)

PHYS 1001. Elementary Physics. (LIB ED ELC; 3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Fundamental laws of mechanics, fluids, temperature, gas laws, electricity, wave motion, origins of modern physics, radioactivity. prereq: Math 1031

PHYS 1002. Introductory Meteorology. (PEOPLE/ENV,PHYS SCI; 4 cr. ; Student Option; Periodic Fall & Spring)
An introductory course on the atmospheric environment. Meteorological concepts are presented in a practical manner to stimulate curiosity and answer questions about weather and climate. Topics include earth's atmosphere, clouds, precipitation, winds, fronts, forecasting, thunderstorms, tornadoes, hurricanes, changing climate, air pollution and optics.

PHYS 1003. Introduction to Astronomy. (PEOPLE/ENV,PHYS SCI; 4 cr. ; Student Option; Every Fall, Spring & Summer)
Human's place in Universe. Earth, other planets, sun, stars, galaxies. Background/ fragility of life on Earth. Scale, origin, history of Universe.

PHYS 1012. Introductory Physics. (PEOPLE/ENV,PHYS SCI; 4 cr. ; Student Option; Every Fall, Spring & Summer)
Motion, forces, torque, energy, heat, sound, light, electricity, magnetism. Emphasizes applications. prereq: Math 1031

PHYS 1101. Introductory College Physics I. (PHYS SCI; 4 cr. ; Student Option; Every Fall)
First of two-semester sequence. Algebra-based introduction to physics and physics problem solving. Motion, forces, torque, momentum, energy, thermal energy/heat. Topics presented in applied context. prereq: Math 1031

PHYS 1102. Introductory College Physics II. (PHYS SCI; 4 cr. ; Student Option; Every Spring)
Second of two-semester sequence. Algebra-based introduction to physics and physics problem solving. Vibrations, light, sound, electricity, magnetism. Selected modern physics topics (e.g., radiation). Topics presented in applied context. prereq: Math 1031, Phys 1101

PHYS 1301. Introductory Physics I for Science and Engineering. (PHYS SCI; 4 cr. ; Student Option; Every Fall)
First in sequence of calculus-based general physics course using fundamental principals to solve quantitative problems. Motion, forces, conservation principles, and thermodynamics.

Applications to mechanical systems. prereq: Math 1271

Political Science (POL)

POL 1001. American Government. (ETH/CIV RE; 4 cr. ; Student Option; Every Fall, Spring & Summer)
Introduction to politics/government in United States. Constitutional origins/development, major institutions, parties, interest groups, elections, participation, public opinion. Ways of explaining politics. Nature of political science.

POL 1054. Comparative Government. (3 cr. ; Student Option; Periodic Fall & Spring)
Government systems of the United States, Soviet Union, Great Britain, Japan, and France. Third World and Middle Eastern countries' political and social impacts studied through current events.

Psychology (PSY)

PSY 1001. General Psychology. (HI/BEH/SSC; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Overview of psychology as scientific study of human/animal behavior. Emphasizes goals of psychology: to describe, understand, predict, and control behavior. Biological, cognitive, affective, and social perspectives.

PSY 1093. Lifespan Development. (HI/BEH/SSC; 3 cr. ; Student Option; Every Spring)
Human life span perspective. Integrates developmental principles through research of social issues. Theories of major developmental theorists, recent challenges from changes in society/family interrelationships. Total environmental issues. Progress in genetics/medicines toward a better understanding of human development.

PSY 2253. Human Behavior and Diversity Issues. (3 cr. ; Student Option; Every Spring)
Understanding diversity from psychological, political, economic, and industrial perspectives. Dynamics of race, ethnicity, culture, and gender in American society. prereq: 1001

PSY 3201. Social Psychology. (3 cr. ; Student Option; Every Spring)
How thoughts, feelings, and behavior of individuals are affected by others. Social influence/interaction. Attitude measurement/change. Conformity, impression formation, attribution theory, aggression, prosocial behavior.

PSY 3520. Industrial and Organization Psychology. (4 cr. ; Student Option; Every Spring)
Psychology of business enterprise. Leadership, labor relations, motivation, selection, performance, stress, group dynamics, organizational structure/change. Experiential learning, student centered discussion. prereq: 1001, 3707

PSY 3604. Abnormal Psychology. (; 3 cr. ; Student Option; Every Fall & Spring)
Comprehensive study of abnormal behavior. Focuses on causal factors, treatment, and outcome of maladaptive behavior. Systematic study of biological, behavioral, and psychosocial therapies as modes of treatment and prevention of disorders. Lectures, case studies, videos, group discussions, oral presentations, term paper. prereq: Psy 1001

PSY 3707. Organizational Psychology. (3 cr. ; Student Option; Every Fall)
Leadership, job satisfaction, motivation theories, goal setting, organizational behavior, organizational development, industrial relations. prereq: 1001

PSY 3804. Individual Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

PSY 4203. Organization and Transitional Change Seminar. (3 cr. ; Student Option; Every Fall)
Historical, contemporary, and emerging changes in cultures/societies on international/U.S. domestic organizations. Stages of change, strategies. Tools to assist individuals/organizations through systems processes leading to positive outcomes. prereq: [1001, 3707] or instructor consent

Public Health (PUBH)

PUBH 1001. Success Over Stress (UMTC). (; 1 cr. ; Student Option; Every Fall & Spring)
Understand stress/how to manage it. Holistic health perspective/impact of stress on all aspects of life. Causes, effects, consequences of stress for students/society. Tools/resources to manage stress during college/life.

PUBH 1003. Alcohol and College Life (UMTC). (; 1 cr. ; Student Option; Every Fall & Spring)
Facts about how alcohol affect college life. Personal prevention strategies. Maximizing student/campus safety. Web-based distance learning format. prereq: Fr or soph or pseo

PUBH 1004. Sexuality Matters (UMTC). (; 1 cr. ; Student Option; Every Fall & Spring)
Knowledge/skills to lead healthy sexual lives. Unbiased, medically accurate, evidence-based information/programs. Communication skills. Dispel sexuality/relationships myths.

PUBH 1005. Sleep, Eat & Exercise (UMTC). (; 1 cr. ; Student Option; Every Fall & Spring)
Living balanced life while in college. Nutrition, sleep, physical activity. Techniques to promote self-awareness, reflection, goal setting, action toward wellness.

PUBH 3005. Fundamentals of Alcohol and Drug Abuse for Teacher Education (UMTC). (; 1 cr. ; Student Option; Every Fall & Spring)
Scientific and socio-cultural aspects of alcohol and drug problems. Emphasizes role of education in health conservation and drug abuse prevention. prereq: Undergrad in Agricultural Education, Early Childhood Education or Elementary Education

PUBH 3102. Issues in Environmental and Occupational Health (UMTC). (; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Scope of the field of environmental health. Concepts upon which environmental interventions are based. Consulting literature to identify appropriate interventions for community environmental health problems. Online course through Twin Cities campus.

Sociology (SOC)

SOC 1001. Introduction to Sociology. (HI/BEH/SSC,HUMAN DIV; 3 cr. ; Student Option; Every Fall, Spring & Summer)
Culture, social institutions, socialization, groups, social class, race and ethnicity, collective behavior, and social deviance.

SOC 1102. Cultural Anthropology. (GLOB PERSP,HI/BEH/SSC; 3 cr. ; Student Option; Periodic Fall)
Human culture from advent of agriculture to present. Methods used in cultural anthropology; linguistics; general theories of culture; functions of religion, law, kinship, systems, and other major influences in selected cultures.

SOC 3001. Social and Behavioral Science Research Methods. (; 3 cr. ; Student Option; Every Fall)
Fundamental concepts/methods involved in conducting social/behavioral science research. Design a research project, collect relevant data, conduct data analysis and report/present research findings.

SOC 3005. Sociology of the Family. (HI/BEH/SSC,HUMAN DIV; 3 cr. ; Student Option; Every Spring)
Critical analysis of the family as a social institution, macro- and micro-level theoretical analysis of families and its interrelationship with other social institutions. Emphasizes the functions of the family, interaction among its members, and cultural forces affecting family.

SOC 3937. Social Gerontology: Elders in American Society. (; 3 cr. ; Student Option; Every Fall)
Survey of characteristics/concerns of older persons. Physical, social, psychological, and cultural factors associated with aging. Individual outside work with older person.

Software Engineering (SE)

SE 1500. Discrete Structures I. (3 cr. ; Student Option; Every Fall)
Foundations of discrete mathematics as they apply to software engineering. Functions, relations, sets, simple proof techniques, boolean algebra, propositional logic, digital logic, elementary number theory, fundamentals of counting.

SE 1600. Discrete Structures II. (3 cr. ; Student Option; Every Spring)
Predicate logic, recurrence relations, graphs, trees, matrices, computational complexity, elementary compatibility, discrete probability. prereq: 1500

SE 1803. Directed Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)

Current topics not covered in regularly offered courses. prereq: Instructor consent

SE 2050. Introduction to Programming I. (; 3 cr. ; Student Option; Every Fall)
Structured/object oriented programming with current industry accepted languages. Data, selection, and iteration structures. Input/output operations, class definitions, interfaces, exception handling, inheritance, composition, polymorphism. prereq: MATH 1031 or 2 yrs high school algebra or ACT score of 20

SE 2070. Introduction to Programming II. (; 3 cr. ; Student Option; Every Spring)
Java programming language and development process. Objects, classes, packages, applets. prereq: 2050

SE 2090. Data Structures and Algorithms. (3 cr. ; Student Option; Every Fall)
Recursion, underlying philosophy of object-oriented programming. Fundamental data structures (including stacks, queues, linked lists, hash tables, trees, graphs). Algorithmic analysis. Principles of language translation. prereq: 2070

SE 2100. Microcomputer Systems Architecture. (; 3 cr. ; Student Option; Every Fall)
Computer organization/machine architecture. Overview of computer system organization. Digital logic level, register level, operating system program interface. May use assembly language of an available machine for programming assignments.

SE 2200. Introduction to Software Engineering. (3 cr. ; Student Option; Every Fall)
Software development methodologies. Emphasizes object-oriented methodologies. Risk analysis, testing techniques/strategies, project management, architectural/user interface design, technical metrics for software. prereq: 2050

SE 2300. Software Construction. (3 cr. ; Student Option; Every Fall)
Low-level software design issues, including formal approaches. prereq: 2200

SE 2400. Software Engineering Approach to Human Computer Interaction. (3 cr. ; Student Option; Every Fall)
Topics relating to designing/evaluating user interfaces. Psychological background needed to understand people.

SE 2994. Introductory Undergraduate Research. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Intermediate independent work in special fields. prereq: instructor's consent

SE 3050. Database Management Systems. (; 3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Database design management/implementation. Data modeling, normalization, relational algebra, SQL, Procedural SQL, physical database design, distributed databases. Use of common DBMSs and modeling tools. prereq: 2050

SE 3060. Data Warehousing and Mining. (; 3 cr. ; Student Option; Every Spring)
How data warehousing/mining fits in decision support systems. Data warehouse planning, design, implementation on enterprise DBMS. Data mining techniques/algorithms. Application of data mining software. prereq: 3050, MATH 1150

SE 3100. Object-Oriented Programming. (3 cr. ; Student Option; Every Spring)
C# programming language fundamentals. Some of the C# features are already found in existing languages, while others are unique to C#. The course will focus mainly on the new features in C# with respect to C++ and Java. prereq: 2050

SE 3200. Software Design and Architecture. (3 cr. ; Student Option; Every Fall)
Formal methods of software analysis/design. Requirement analysis, definition. Specification, including formal methods, prototyping. Design, including object/function oriented design. prereq: 2200

SE 3300. Software Quality Assurance and Testing. (3 cr. ; Student Option; Every Spring)
Software quality assurance. Reviews/inspections, testing, formal verification methods, process management/improvement, defect prevention. prereq: 2200

SE 3400. Software Requirements Analysis. (3 cr. ; Student Option; Every Spring)
Discovering/eliciting requirements, languages and models for representing requirements, analysis/validation techniques, specifying/measuring external qualities, requirements in agile processes, requirements change management. prereq: 2200

SE 3804. Individual Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

SE 3820. Gaming: Real-Time Systems. (; 3 cr. ; Student Option; Every Spring)
Mathematical foundations/modeling techniques, mapping, anti-aliasing, real-time rendering, binary space partition trees, object control issues. prereq: 3050, Math 1272, Phys 1102

SE 3900. Internship. (3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Identify employment opportunities in field. prereq: Instructor consent

SE 3994. Undergraduate Research. (1-4 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Advanced independent work in special fields. prereq: Instructor consent

SE 4050. Advanced Web Application Development. (; 3 cr. ; Student Option; Every Fall)
Provide students with current/advanced techniques for World Wide Web software development including XML, XHTML, HTML5, CSS, server-side scripting languages such as Javascripting & PHP, and Web databases. This course surveys a variety of Web development technologies and issues related to developing dynamic Web sites. prereq: 3050, CA 1040

SE 4100. Introduction to 3D Simulation Programming. (; 3 cr. ; Student Option; Every Fall & Spring)
Java/OpenGL (JOGL) to introduce basic concepts of 3D simulation programming and theory. Matrices/transformations, primitive construction, texture mapping, basic user interaction, animation. prereq: 2090

SE 4110. Simulation and Game Development. (; 3 cr. ; Student Option; Every Fall & Spring)
Building simulations/developing games involving 3D modeling/animations. Advanced Programming, 3D Graphics Programming/Immersive Visualization, Interactive Architectures, Simulations.

SE 4200. Software Project Management. (; 3 cr. ; Student Option; Periodic Fall & Spring)
Introduction to software project management. Issues include effort estimation and costing, project planning and scheduling, option analysis, software quality assurance, and formal technical reviews. prereq: 2200

SE 4500. Senior Project I. (3 cr. ; Student Option; Every Fall)
Individual project/research course. Pursue projects or research (applied in nature) with faculty adviser, within area of specialization. prereq: Instructor consent

SE 4510. Senior Project II. (3 cr. ; Student Option; Every Spring)
Second of a full year, individual project/research course. Students pursue projects or research (applied in nature), with a faculty adviser, within their area of specialization. prereq: 4500

Soil Science (SOIL)

SOIL 1293. Soil Science. (3 cr. ; Student Option; Every Fall & Spring)
Formation, classification, and composition of soils, with emphasis on environmental quality, chemical and physical properties affecting growth and nutrition of plants, management principles and practices used to increase productivity and conserve soil and water resources for agronomic crops. prereq: Chem 1001

SOIL 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Topics not offered in regularly schedule courses.

SOIL 3414. Soil Fertility and Plant Nutrition. (4 cr. ; Student Option; Every Fall & Spring)
Soil fertility management and its effect on crop growth. Uptake and use of specific important nutrients; use of fertilizers, their composition and characteristics; importance of residue management to maintain high productivity; environmental impact of certain agronomic practices. prereq: Soil 1293, soph, or instructor consent

SOIL 3550. Soil Genesis, Morphology and Survey. (4 cr. ; Student Option; Fall Odd Year)

Processes of soil formation, morphology and use of soil survey information. Practical field experience describing soil properties. Required field trips. prereq: 1293

SOIL 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Summer)
Topics not offered in regularly scheduled courses.

SOIL 3994. Undergraduate Research. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Advanced independent work in special fields.

Soil and Water Management (SWM)

SWM 3009. Hydrology and Water Quality. (4 cr. ; Student Option; Every Spring)
Principles/theory of surface/ground water quality, including but not limited to water budget, hydrologic cycle, water quantities, Darcy's Law, water quality units and flow rates, hydraulic conductivity/permeability, and laboratory tests for and maintenance of water quality. prereq: Chem 1001, Math 1031, Soil 1293, jr, or instructor consent

SWM 3103. Meteorology and Climatology. (3 cr. ; A-F or Audit; Every Spring)
Fundamentals of weather/climate. Energy balance, weather chart analysis, composition/ circulation patterns of atmosphere, climates of continents. prereq: PHYS 1012

SWM 3224. Soil and Water Conservation. (4 cr. ; Student Option; Every Fall)
Management principles and practices used to increase productivity and conserve soil and water resources for agronomic crops. Maintaining wildland and environmental quality through use of shelterbelts. prereq: Soil 1293, jr, or instructor consent

SWM 3225. Watershed Management. (3 cr. ; Student Option; Every Fall)
Precipitation, infiltration, evapo-transpiration, runoff from small watersheds. Application to design of structures, water/wind erosion practices. Design principles/techniques in constructing small impoundments and waste holding facilities, and in restoring wetlands. Selecting/applying irrigation/drainage systems.

Spanish (SPAN)

SPAN 1104. Beginning Spanish I. (4 cr. ; Student Option; Every Fall & Spring)
Conversational Spanish centered on day-to-day experiences. Emphasis on verb conjugation, rules of grammar, and vocabulary building. Cultural awareness and appreciation.

SPAN 1204. Beginning Spanish II. (4 cr. ; Student Option; Every Fall & Spring)
Emphasis on verb conjugation with the addition of compound tenses, indicative and subjective moods. Vocabulary building; dialogue concerning sports, travel, service information. Cultural and political dimensions of Spanish-speaking countries. prereq: Span 1104 or 2 years high school Spanish

Speech (SPCH)

SPCH 1101. Public Speaking. (COMMUNICAT; 3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Topic selection, research, organization, rehearsal, and extemporaneous delivery of informative and persuasive speeches.

Sport & Recreation Management (SRM)

SRM 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Current topics not covered in regularly offered courses. prereq: Instructor consent

SRM 2000. Prevention and Care of Athletic Injuries. (; 3 cr. ; A-F or Audit; Every Spring)
Instruction/practice in fundamental athletic training skills. Historical perspective of athletic training as career. Basic terminology of injuries. Prevention, taping, immediate care. prereq: BIOL 2103

SRM 2010. Topics in Coaching. (; 2 cr. [max 6 cr.] ; Student Option; Every Fall)
Philosophies, theories, methods, techniques of coaching different sports.

SRM 2020. Foundations of Sport and Recreation Management. (; 3 cr. ; Student Option; Every Fall)
Fundamental content areas. Career opportunities, principles/issues in sport ethics, personnel/financial management, sport law, facility/event management, strategic planning, sport marketing.

SRM 3001. Sport Nutrition. (; 3 cr. ; Student Option; Every Spring)
Nutrition principles applied to fitness/sport. Six nutrients, body composition, training/ conditioning, weight maintenance, nutrition in competitive sports. prereq: Biol 1009 or Chem 1001 or HSci 1123

SRM 3002. Sport Law and Governance. (; 3 cr. ; Student Option; Fall Even Year)
Legal principles affecting managers, sponsors, users of sport/recreation programs. Vocabulary of contract negotiation/civil rights in planning, developing, maintaining, managing sport/ recreation organizations. prereq: GBUS 3107

SRM 3003. Sport Facility and Activities Management. (; 3 cr. ; Student Option; Every Spring)
Designing, planning, and controlling sport facilities and sport event logistics. Scheduling and planning of sport events. Box office management. Security and supervision of facility events, safety and medical services, housekeeping maintenance. Concessions, merchandise. Risk management, insurance.

SRM 3005. Athletics Administration. (; 3 cr. ; Student Option; Spring Even Year)
Administration of policies and procedures for amateu/professional athletics organizations; covers both private and public athletics administrations.

SRM 3006. Sport Marketing and Communication. (; 3 cr. ; Student Option; Every Fall)
Applying theories/principles of marketing to sport industry. How marketing is used in various SRM settings, from local sporting/ amateur events to professional leagues. prereq: MKTG 3300

SRM 3008. Sport Ethics and Leadership. (; 3 cr. ; Student Option; Fall Odd Year)
Ethical issues in recreation/sport. Explore values/apply critical thinking. Ethical theories. Developing framework for ethical decision-making. Applying decision-making framework to industry needs. prereq: 2000

SRM 3012. Sport Finance and Economics. (; 3 cr. ; Student Option; Every Spring)
Traditional/innovative methods of revenue acquisition, financial management in sports organizations. Broader economic impact/ implications of sport in society. Importance of budgeting/finance in sports industry.

SRM 3020. Coaching Practicum. (; 1 cr. ; Student Option; Every Fall & Spring)
Apply coaching technique in clinical setting. prereq: 2010

SRM 3100. Psychology of Sport. (; 3 cr. ; Student Option; Every Spring)
Theories, concepts, and interventions related to sport and exercise psychology. Topics covered includes: motivation, team/group dynamics, psychological skills training, psychology of injury, and burnout.

SRM 3200. Socio-Cultural Dimensions in Sport. (; 3 cr. ; Student Option; Every Fall)
Ways sport is linked to other spheres of social life. Organization/behavior patterns within sport settings. Cultural, structural, situational factors, social processes related to sport.

SRM 3320. Applied Sports Physiology. (3 cr. ; Student Option; Spring Odd Year)
Responses/adaptations of body's physiological systems to physical activity, biochemical foundations of these changes. Techniques and strategies useful for coaches, physical educators, and other exercise scientists in developing training programs beneficial for athletes/clients. prereq: Biol 2103

SRM 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses. prereq: Jr, instructor consent

SRM 3900. Internship. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Field-based learning experience. Minimum of 3 credits is required. prereq: Jr, instructor consent

SRM 4099. Seminar in Sport and Recreation Management. (1 cr. ; Student Option; Every Spring)
Capstone course emphasizing design, implementation, and evaluation of an entire sport or recreation program in terms of a virtual portfolio. prereq: Sr, instructor consent

SRM 4800. Sport and Recreation Management Capstone. (; 3 cr. ; Student Option; Every Spring)

Capstone course emphasizing design, implementation and evaluation of an entire sport or recreation program. Students will be expected to develop a senior project that could be used in a portfolio when applying for a job.

Theatre (TH)

TH 1121. Theatre Production. (HUMANITIES; 1 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Involvement in one or more of the following: acting, directing, costuming, set construction, makeup, publicity, coaching, lighting, sound.

TH 1131. Acting I. (3 cr. ; Student Option; Spring Even Year)
Introduction to acting for theater. Physical/vocal training. Creativity/emotional recall exercises. Performance. Basic techniques of acting.

TH 2434. Oral Interpretation and Performance Techniques. (HUMANITIES; 3 cr. ; Student Option; Spring Even Year)
Analyzing prose, poetry, drama. Preparing material for presentation. Giving stimulating oral readings. Critical appreciation of literature. Use of voice/gesture. Critiquing performances.

Turf (TURF)

TURF 1072. Principles of Turf Management. (3 cr. ; Student Option; Every Spring)
Species identification. Cultural requirements/ principles for establishing, producing, and maintaining turf. Golf course turf care/ maintenance.

TURF 1803. Directed Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topics not offered in regularly scheduled courses.

TURF 3072. Turfgrass Science. (3 cr. ; Student Option; Fall Odd Year)
Management requirements of intensively cultured turfgrass areas. Emphasis on golf course/ athletic fields. Interrelationships among soil, plant atmospheric environments. Management practices/turfgrass quality. prereq: 1072

TURF 3074. Turfgrass Pest Management. (3 cr. ; Student Option; Every Spring)
Identification/control of turfgrass diseases, weeds, and insects. Emphasizes integrated cultural/chemical management methods. prereq: 3072 or instructor approval

TURF 3075. Turf Stress Management. (3 cr. ; Student Option; Fall Even Year)
Environmental stress factors integrated with cultural practices to enhance turfgrass performance/implement management practices that reduce stress injury. prereq: 1072, 3072

TURF 3076. Turfgrass Management Systems. (3 cr. ; Student Option; Every Fall)
Advanced skills for establishment, maintenance, and renovation. Strategies for developing turfgrass management systems. Decision-making and problem-solving in applied-business context. Professional skills development. prereq: 3074

TURF 3077. Turf and Landscape Irrigation Design and Installation. (2 cr. ; A-F or Audit; Every Fall)
Basic irrigation design, including pipe sizing/ selection, pressure loss, sprinkler types/ selection. Installation equipment, techniques. Lab.

TURF 3078. Integrated Turfgrass Diagnostics. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Diagnostic features/identifying characteristics for all turfgrass species, seed, turfgrass pests (weeds, insects, diseases), fertilizer materials. Appropriate pesticides, applied mathematical skills/best management practices for world-wide golf course learning. prereq: 1072

TURF 3804. Individual Studies. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topics not included in regularly scheduled courses.

TURF 3994. Undergraduate Research. (1-3 cr. [max 6 cr.] ; Student Option; Every Fall & Spring)
Advanced independent work in special fields.

Undergraduate (UGRD)

UGRD 4999. Undergraduate Summer Research. (0 cr. ; No Grade Associated; Every Summer)
Undergraduate Summer Research

University of MN Crookston (UMC)

UMC 1200. Introduction to University Life. (CR THINKG; 2 cr. ; Student Option; Every Fall)
This course sets the groundwork for acquiring the critical thinking skills necessary to successfully complete a degree at UMC, while also assisting students in their transition to college life and fostering a culture of engaged learning. All new high school students are required to enroll in the course their first semester on campus.

UMC 1202. Topics in Problem Solving. (CR THINKG; 1 cr. ; Student Option; Every Spring)
Through high impact learning practice (e.g., undergraduate research, service learning), students will learn to apply problem solving techniques to current issues. All new high school students are required to enroll in the course in their second semester on campus.

Writing (WRIT)

WRIT 1803. Directed Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's minor not covered in regularly offered courses.

WRIT 2223. English Grammar and Usage. (; 3 cr. ; Student Option; Every Fall)
Grammar, grammatical concepts. Processes/ structural rules that describe how words combine with each other to form sentences. Practice in sentence diagramming. prereq: COMP 1011

WRIT 2335. Introduction to Creative Writing. (HUMANITIES; 3 cr. ; Student Option; Spring Even Year)
Principles of creative writing. Basic literary/ writing-craft concepts/terminology. Literary works. Practice writing, critiquing prose/poetry. prereq: COMP 1011

WRIT 3002. Applied Literary Theory and Criticism. (; 3 cr. ; Student Option; Every Spring & Summer)
Seminal literary theories in English studies, such as poststructuralism, postmodernism, postcolonial theory, feminist theory, gay and lesbian criticism/queer theory, and race and ethnicity studies. Applies theoretical approaches to literary texts.

WRIT 3303. Writing in Your Profession. (; 3 cr. ; A-F or Audit; Every Fall, Spring & Summer)
Writing about subjects related to students' academic disciplines and future professions. Developing persuasive writing skills for academic, personal, and professional purposes. Effective communication principles, audiences, formats, and technologies. prereq: Comp 1011 and 1013 or 6 credits of writing

WRIT 3804. Individual Studies. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Topic related to student's major not covered in regularly offered courses.

WRIT 3856. Editing. (; 3 cr. ; Student Option; Spring Even Year)
Copy editing for accuracy, completeness, consistency, correctness. Comprehensive editing. Symbols of markup. Electronic editing. Style sheets/manuals. Proofreading. Editing visuals. Team editing tools. prereq: Comp 1013

WRIT 3860. Topics in Writing. (; 3 cr. [max 6 cr.] ; Student Option; Fall Even Year)
Advanced level of writing/critiquing original fiction, nonfiction, poetry, drama. Reading/ discussion regarding craft of writing/ characteristics of great literature.

WRIT 3861. Advanced Creative Writing. (HUMANITIES; 3 cr. ; Student Option; Fall Even Year)
Advanced principles of creative writing. Advanced literary/writing-craft concepts/ terminology. Literary works. Practice writing, critiquing prose/poetry, constructing a lengthy creative piece.

WRIT 3900. Seminar Experience in English. (3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Internship, publishing, or presentation experience sites may include University, professional, or industry agencies. Internship proposal, progress report, final report with letter from internship supervisor required.

WRIT 3994. Undergraduate Research in English. (; 1-3 cr. [max 6 cr.] ; Student Option; Every Fall, Spring & Summer)
Advanced research experience that results in the completion of conference-worthy and publication-worthy text.