

**CIVL - 1011 Civil AutoCAD, 1.00 Credit**

Level: Lower

This course will give the student the basic skills necessary to complete dimensioned drawings in AutoCAD. Topics include: setting up a drawing, basic lines and coordinates, geometric shapes, layering, editing commands, dimensioning, creating text, hatching and plotting to scale.

**CIVL - 1013 Portland Cement Concrete, 3.00 Credits**

Level: Lower

Applied Learning-Field Study, Course Fee \$15.00

This course introduces aggregates and concrete as construction materials. Standard techniques of measurements and computation are presented and then applied to testing materials. The student is prepared to reach the level of Concrete Field Testing Technician Grade 1, with emphasis on the American Concrete Institute studies of Portland Cement Concrete, and on quality control in the field. Concrete masonry block is reviewed as a product of cement.

**CIVL - 1182 Civil Tech Graphics, 2.00 Credits**

Level: Lower

Applied Learning-Practicum

This is an introductory course in construction/civil/surveying graphics. The student will be introduced to scales, dimensioning, surveying maps, house plans, building codes, and construction terminology. Contour maps, wall sections, foundation plans, floor plans, and house elevations will be drawn and plotted using industry standard software.

**CIVL - 1204 Surveying I, 4.00 Credits**

Prerequisite(s): MATH 1033 with D or better \* or MATH 1034 with D or better \* or MATH 1054 with D or better \* or MATH 1063 with D or better \* or MATH 1084 with D or better \* or MATH 2043 with D or better \* or MATH 2074 with D or better \* or MATH 2094 with D or better \*

Level: Lower

Applied Learning-Field Study

This course is a study of the fundamentals of construction surveying. Emphasis is on the use and care of various types of surveying equipment, note keeping, basic surveying calculations and adjustment of data. The course is designed to introduce measurement techniques through applications in an outdoor laboratory environment.

**CIVL - 2154 Quality Control of Const Matl, 4.00 Credits**

Level: Lower

Applied Learning-Field Study

This course will equip students with skills typical of a quality control technician in soils and asphaltic concrete. Students will learn about the properties of soil, including laboratory testing of soil that will lead to the classification of soils. Students will also design and test asphaltic concrete mixes using industry procedures and standards.

**CIVL - 2204 Surveying II, 4.00 Credits**

Prerequisite(s): CIVL 1204 with D or better

Level: Lower

Applied Learning-Field Study

This is the second course of a two-semester sequence emphasizing plane and route surveying theory and techniques. Emphasis will be on circular curves, vertical curves, profiling, cross-sectioning, realignment of circular curves, spiral curves, earthwork calculations, construction stakeout procedures and an introduction to electronic distance measurement.

**CIVL - 3053 Construction Methods & Practic, 3.00 Credits**

Level: Lower

This course is a study of materials and methods employed in construction. Topics include building foundation, envelope, and finishes. Throughout the course, attention will be given to sustainability of construction materials and methods.

**CIVL - 3204 Legal Asp & Prac of Land Surv, 4.00 Credits**

Prerequisite(s): CIVL 2204 with D or better

Level: Lower

In this course students will develop an understanding of the professional land surveyor's role in society, the professional land surveyor's legal responsibility to the public, systems used to describe real property, types of transfer of real property, techniques of record research, and locating sequential and simultaneous real property conveyances.

**CIVL - 3214 Geodesy, 4.00 Credits**

Prerequisite(s): MATH 1054 with D or better or MATH 2043 with D or better or MATH 1063 with D or better

Level: Lower

Course emphasizes the techniques of precise horizontal and vertical control surveying used by government or private surveyors and engineering consultants. Use of directional theodolites, precise levels and total station measurement equipment are stressed. Projects are used to present underlying theory of field work, standards, specifications, and adjustment of horizontal and vertical data.

**CIVL - 3553 Comm Bldg Const Methods & Prac, 3.00 Credits**

Prerequisite(s): ( CIVL 1011 with D or better and CIVL 1182 with D or better ) or BLCT 3606 with D or better or BLCT 3706 with D or better or BLCT 3306 with D or better or ELTR 3306 with D or better

Level: Lower

This course is a study of materials and methods of construction employed in commercial building construction. This course will be used to extend the students' graphics skills using BIM/3-D software as well as their knowledge of the building construction process. Topics include: foundation, steel frame and reinforced concrete construction. Throughout the course, attention will be given to sustainability of construction materials and methods.

**CIVL - 4043 Construction Management, 3.00 Credits**

Level: Lower

This course is a study of the business organizations, contracts, personnel and ethics used in construction projects. Topics include the stakeholders, contracts, cost accounting, construction documentation, planning and scheduling, bonding, insurance, labor relations and ethics as specifically experienced in the construction industry.

**CIVL - 4103 Structures I, 3.00 Credits**

Prerequisite(s): ( MATH 1054 with D or better or MATH 1063 with D or better or MATH 1084 with D or better or MATH 2043 with D or better ) and ( PHYS 1024 with D or better or PHYS 1044 with D or better )

Level: Lower

This course provides the students with a quantitative understanding of the effect of loads on structural elements in a building. Principles of structural mechanics are covered from forces and stresses to properties of section, and finally to shear and bending moments on beams. The designs of basic timber and steel beams and columns are also presented.

**CIVL - 4143 Contracts, Specs, & Estimating, 3.00 Credits**

Prerequisite(s): CIVL 3553 with D or better or ARCH 4014 with D or better

Level: Lower

Applied Learning-Creative Work

This course is a study of contracts and specifications governing contractors in the construction phase of a project. Students will practice the estimating of earthwork, masonry, concrete, steel, and wood. Students will progress through manual takeoffs to electronic spreadsheets. At the completion of this course, the student will be able to create an estimate for a construction project.

**CIVL - 4204 Subdivision Theory & Appli, 4.00 Credits**

Prerequisite(s): CIVL 3204 with D or better

Level: Lower

Applied Learning-Practicum

This course is an introduction to the U.S. Public Lands Survey System, the laws of simultaneous conveyances, and subdivision of lands. Governmental regulations and environmental considerations will be addressed. Industry standard software will be utilized in the laboratory.

**CIVL - 4214 Surveying Practicum, 4.00 Credits**

Prerequisite(s): CIVL 3214 with D or better and CIVL 3204 with D or better

Level: Lower

Applied Learning-Practicum

This course consists of a series of field and office problems in surveying. Topics include research, field reconnaissance, data collection, deed interpretation, and mapping. Students are responsible for the execution of a comprehensive surveying project.

**CIVL - 4243 Surveying Computer Appli, 3.00 Credits**

Prerequisite(s): CIVL 1204 with D or better and CIVL 2204 with D or better and CIVL 3214 with D or better

Level: Lower

This course is an introduction to the concepts of field to office automation, the use of coordinate geometry (COGO) software programs and computer aided drafting (CAD) software programs. Emphasis will be placed on the use of the computer in the solution of problems and projects that stress data analysis, data adjustment, mapping calculations and the application of computer graphics.

**CIVL - 4273 Photogrammetry & Image Interpr, 3.00 Credits**

Level: Lower

This course will introduce the advantages of photogrammetry, LiDAR and Remote Sensing as a mapping and planning tool. The types of photography, photo scale, flight planning techniques and specifications, displacement calculations and stereoscopic measurement are covered.

**CIVL - 4900 Directed Study, 1.00 TO 6.00 Credits**

Level: Lower

A student may contract for one to six credit hours of independent study through an arrangement with an instructor who agrees to direct such a study. The student will submit a plan acceptable to the instructor and to the department chairperson. The instructor and student will confer regularly regarding the process of the study.

**CIVL - 5114 Land Surveying, 4.00 Credits**

Prerequisite(s): CIVL 3204 with D or better

Level: Upper

Upper Level

A study of licensure requirements, professional liability and ethics. The legal concepts of the rules of evidence are presented and applied to written and unwritten transfers of land ownership. Riparian rights, reversionary rights, problems of appointment, procedures, both field and office, for locating written title boundaries and the writing of deed descriptions are discussed in both a theoretical and applied sense.

**CIVL - 5213 Reinforced Concrete, 3.00 Credits**

Prerequisite(s): CIVL 4104 with D or better or CIVL 4103 with D or better

Level: Upper

Upper Level

This course introduces students to basic design principles of reinforced concrete structural members such as beams, and slabs. Topics will include bending of single and doubly reinforced beams, T-beams, and slabs, as well as an introduction to the fundamentals of mechanics of bending. The design of tensile and compressive reinforcing bars in the members will be included as well. Students will learn methods and materials used in concrete work with attention given to the materials and methods of formwork construction. In addition, students will learn building code requirements for structural concrete of the American Concrete Institute (ACI).

**CIVL - 5900 Directed Study, 1.00 TO 6.00 Credits**

Level: Upper

Upper Level

A student may contract for one to six credit hours of independent study through an arrangement with an instructor who agrees to direct such a study. The student will submit a plan acceptable to the instructor and to the department chairperson. The instructor and student will confer regularly regarding the process of the study.

**CIVL - 6104 Anlys & Adjmnts of Surv Mrmnts, 4.00 Credits**

Prerequisite(s): MATH 2074 with D or better or MATH 2094 with D or better

Level: Upper

Upper Level

This course is an introduction to the adjustment of survey data, incorporating the use of the computer and matrix algebra. Error propagation, least-squares adjustment methods and the analysis of survey measurements will be covered.

**CIVL - 6113 Environmental Tech Concepts, 3.00 Credits**

Prerequisite(s): MATH 1033 with D or better or MATH 1034 with D or better or MATH 2043 with D or better or MATH 1063 with D or better

Level: Upper

Upper Level

This course focuses on environmental technology systems. Topics covered will include: basic environmental concepts, water quality, water pollution, drinking water, storm water management, wastewater treatment, municipal solid waste, hazardous waste, air pollution, noise pollution, erosion control and environmental assessments. During the course, the student will analyze a site plan to determine the "best practice" solutions to storm water management challenges using industry standards. At the end of the course the student will be able to make decisions with regards to various environmental issues that will come both in the workplace and in the student's personal life. Leadership in Energy and Environmental Design, (LEED) criteria and sustainable building issues will also be addressed.

**CIVL - 6123 Mechanical Systems, 3.00 Credits**

Prerequisite(s): CIVL 3553 with D or better or CIVL 3554 with D or better

Level: Upper

Upper Level

An introduction to building equipment for single and multi-story projects including domestic water, sewer, heating and ventilating systems, and electrical systems. Students will design these systems for a residence or small office building. Students will review blueprints and analyze systems for a large commercial building.

**CIVL - 6154 Supervisory Estimating, 4.00 Credits**

Prerequisite(s): CIVL 3553 with D or better or CIVL 3053 with D or better

Level: Upper

Upper Level

This course provides in depth study of construction estimating as used in winning bids and the change order process during construction. The course teaches the student to use a quantity estimating software package and to incorporate advanced estimating techniques into a final project cost estimate. During the course, the students will complete estimates in several disciplines of construction.

**CIVL - 6212 Construction Safety, 2.00 Credits**

Prerequisite(s): CIVL 3553 with D or better or ARCH 4014 with D or better or CIVL 3053 with D or better

Level: Upper

Upper Level

This course is a comprehensive study of the requirements of an effective safety program that focuses on worker safety, improved productivity and accident risk management. The course will also provide students with an understanding of the Occupational Safety Health Administration (OSHA) standards and their application to the construction industry.

**CIVL - 6214 Advanced Estimating, 4.00 Credits**

Prerequisite(s): CIVL 4143 with D or better

Level: Upper

Applied Learning-Practicum, Upper Level

This course is an extension of topics learned in the basic estimating course. The course teaches students to use a database estimating software package to incorporate advanced estimating techniques into a final project cost estimate. During the course, the students will create estimates on several types of construction including commercial building and heavy civil projects. The student will also learn the concepts of database estimating including how to create and edit a database.

**CIVL - 7001 Sr Seminar & Project Design I, 1.00 Credit**

Level: Upper

Applied Learning-Creative Work, Upper Level

This course is the first of a two-semester sequence required for all Geomatics/Land Surveying Engineering Technology Bachelor seniors. Students design and implement a technical project for completion in CIVL 8003. Project proposal and oral reports are presented for initial approval by department faculty. The weekly seminar encompasses professional licensure examination preparation, aspects of post-graduation professional employment, review of initial project proposal and consultation on project progress.

**CIVL - 7103 Land Development & Design, 3.00 Credits**

Prerequisite(s): CIVL 1204 with D or better and ( MATH 1054 with D or better or MATH 1063 with D or better or MATH 1084 with D or better or MATH 2043 with D or better or MATH 2074 with D or better or MATH 2094 with D or better )

Level: Upper

Upper Level

This course is intended to give the Civil Engineering Technology student an understanding of the issues related to site development and drainage issues for land development. Students will study and create land development plans including drainage calculation, street and road design, water distribution, and sewer design. Issues related to sustainable development will be integrated into the topics to provide the student with an appreciation of concerns related to energy, as well as material and land conservation.

**CIVL - 7114 Geographic Information Systems, 4.00 Credits**

Prerequisite(s): CIVL 3214 with D or better

Level: Upper

Upper Level

A broad-based introduction to GIS; especially the application of spatial analysis and modeling. Applications will cover hardware and software considerations, map overlays, automation in thematic and topographic mapping, raster/vector devices, data acquisition, and related database storage and algorithms. Advanced topics will include error modeling, data uncertainty, and new directions and impacts of GIS.

**CIVL - 7213 Construction Systems, 3.00 Credits**

Prerequisite(s): CIVL 4143 with D or better

Level: Upper

Upper Level

This course examines how people and machines interact to build efficient systems that improve productivity in the construction industry. This course will document existing and emerging construction systems and will delve extensively into production capacity and uses of construction equipment. This course culminates with a project to design equipment spreads for an earthwork project.

**CIVL - 7223 Construction Project Planning, 3.00 Credits**

Prerequisite(s): CIVL 3554 with D or better or CIVL 3553 with D or better

Level: Upper

Applied Learning-Creative Work, Upper Level

Students will develop a construction project management logic diagram for large multi-phased projects. The students will use software for scheduling, monitoring, and "crashing" projects to evaluate alternatives to reduce time to completion and to ensure cost effectiveness and safety considerations.

**CIVL - 7503 Construction Supervision, 3.00 Credits**

Prerequisite(s): COMP 1503 with D or better \*

Level: Upper

Upper Level

This course is an exploration of construction contract types and language. Managing resources such as time, labor, equipment, materials and budget are introduced. Additionally students will be introduced to the business of construction through construction job site cost accounting. Effective oral and written construction supervision communication will be addressed.

**CIVL - 7523 Construction Scheduling, 3.00 Credits**

Prerequisite(s): CIVL 7503 with D or better

Level: Upper

Applied Learning-Practicum, Upper Level

In this course, students will study job site construction scheduling. Software will be employed to produce Critical Path Method analysis. Topics include bar charts, basic scheduling networks, critical path method, resource allocation and leveling, scheduling update and project control, schedule compression techniques, and an introduction to Last Planner System. Students will be required to complete a scheduling project using appropriate industry documents and processes.

**CIVL - 8003 Sr Seminar & Project Design 2, 3.00 Credits**

Prerequisite(s): CIVL 7001 with D or better

Level: Upper

Applied Learning-Creative Work, Upper Level

In this course, students implement a capstone technical project proposed and designed in CIVL 7001. Each student must do research, prepare a plat/map, conduct a formal oral presentation and submit a comprehensive written report.

**CIVL - 8023 Construction Jobsite Admin., 3.00 Credits**

Prerequisite(s): CIVL 4043 with D or better or CIVL 7503 with D or better

Level: Upper

Upper Level

This course is an in-depth study of the documents and processes for construction project administration, including submittals, subcontracting, expediting, pay procedures, closeout and reporting.

**CIVL - 8104 Global Positioning Systems, 4.00 Credits**

Prerequisite(s): CIVL 3214 with D or better

Level: Upper

Upper Level

This course is designed to provide an introduction to the following topics: The U.S. Global Positioning System; other satellite-based navigation systems; GPS terminology; sources of error; GPS accuracy in forested conditions; post-process differential correction; WAAS, DGPS; and mission planning.

**CIVL - 8123 Construction Project Admin, 3.00 Credits**

Prerequisite(s): CIVL 4043 with D or better or CIVL 7503 with D or better

Level: Upper

Upper Level

This course is an in depth study of the documents and processes for construction project administration, including submittals, subcontracting, expediting, pay procedures, closeout and reporting. This course culminates in a simulated construction project where students assume various stakeholder roles.

**CIVL - 8512 Construction Mgmt Internship, 12.00 Credits**

Prerequisite(s): CIVL 7503 with D or better

Level: Upper

Applied Learning-Internship, Upper Level

This course is a work experience designed to assist the student in making the transition from classroom to the construction industry. Students will complete an approved supervised work experience under the direct supervision of an owner, manager or supervisor in a construction related industry. Each student will have a planned work program of educational objectives approved by the student, site supervisor, and Internship Coordinator. Written and oral reports, along with a journal of work activities and experience, will be required.