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 is an introduction to aggregates and concrete as construction materials. Standard techniques of measurements and computation are presented, and then applied to testing materials. Portland Cement Concrete is studied with emphasis on quality control in the field and preparing the student to reach the level of Concrete Field Testing Technician Grade 1, by the American Concrete Institute. Concrete masonry block is also reviewed as a product of cement.

CIVL - 1182 Civil Technology 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 AutoCAD.

CIVL - 1204 Surveying I, 4.00 Credits  
Level: Lower  
Applied Learning-Field Study  
This course is a study of the fundamentals of plane surveying. Emphasis is on the use and care of transit, level, tape and leveling rod, note keeping and 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-Practicum  
This course equips the student with entry level skills as a quality control technician in Soil and Asphaltic Concrete. Students will design and test asphaltic concrete mixes using industrial procedures and standards. Soil classification, permeability, sampling, and composition are studied and applied in laboratory.

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, the spiral, earthwork calculations, construction stakeout procedures and an introduction to electronic distance measurement.

CIVL - 3204 Legal Asp & Pract of Land Surv, 4.00 Credits  
Prerequisite(s): CIVL 3553 with D or better or ARCH 4014 with D or better  
Level: Lower  
Applied Learning-Practicum  
This course is a study of the business organizations, contracts, personnel and ethics used in construction projects. Topics include: the stakeholder, contracts, cost accounting, construction documentation, planning and scheduling, bonding, insurance, labor relations and ethics as specifically experienced in the construction industry.

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  
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 - 3554 Comm Bldg Const Methods & Prac, 4.00 Credits  
Prerequisite(s): CIVL 1013 with D or better and CIVL 1182 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 as well as their knowledge of the building construction process. Approximately equal emphasis will be placed on foundation, steel frame and reinforced concrete construction. Throughout the course, attention will be given to sustainability of construction materials and methods.

CIVL - 4034 Construction Management, 3.00 Credits  
Level: Lower  
Level: Lower  
This course is a study of the business organizations, contracts, personnel and ethics used in construction projects. Topics include the stakeholder, 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 design of basic timber and steel beams and columns are also presented.

CIVL - 4104 Structural Technology, 4.00 Credits  
Prerequisite(s): ( PHYS 1024 with D or better or PHYS 1044 with D or better ) and ( MATH 2043 with D or better or MATH 1054 with D or better or MATH 1084 with D or better or MATH 1063 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 stress to properties of section, and finally to shear and bending moments on beams. The design 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. Practice is given in the estimating of earthwork, masonry, concrete, steel, and wood. Students 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 - 4144 Construction Management, 4.00 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 - 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 is a series of field and office problems for fourth semester AAS Surveying Engineering Technology majors only. 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 Appil, 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 will introduce the advantages of photogrammetry 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 4.00 Credits
Level: Lower
Special course organized to enable students to elect independent study of engineering problems. Course may entail laboratory or analytical solution of problems or application of principles to engineering problems.

CIVL - 5114 Land Surveying, 4.00 Credits
Prerequisite(s): CIVL 3204 with D or better
Level: Upper
This course is a study of licensure requirements, professional liability and ethics in land surveying. The legal concepts of the rules of evidence are presented and applied to written and unwritten transfers of land ownership. Riparian rights, fractional conveyances, reversionary rights, problems of apportionment, 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 Foundations and Concrete, 3.00 Credits
Prerequisite(s): CIVL 4104 with D or better or CIVL 4103 with D or better
Level: Upper
This course introduces students to basic design principles of reinforced concrete structural members such as beams, slabs, and walls. Topics will include bending of single and doubly reinforced beams, T-beams, and slabs, as well as shear design of these members. The design of concrete columns, thickness of reinforcing bars in the members will be included as well. Methods and materials used in concrete work will be discussed with attention given to the materials and methods of formwork construction and pertinent ACI codes and regulations.

CIVL - 5900 Directed Study, 1.00 TO 6.00 Credits
Level: Upper
Upper division independent study.

CIVL - 6102 Community-Economic Redevelopme, 2.00 Credits
Level: Upper
Liberal Arts and Science
This course is a multidisciplinary overview of redevelopment process. This course will be run as a seminar that will meet in a seminar and discussion format. Understanding of the course topics will equip students with the knowledge of community economic development and regeneration project development. It will impart valuable skills for staff and leadership in consulting firms, municipalities, agencies and non-profits that do community development and community regeneration.

CIVL - 6104 Anlys & Adjmts of Surv Mmnts, 4.00 Credits
Prerequisite(s): MATH 2074 with D or better or MATH 2094 with D or better
Level: Upper
This course is an introductory treatment of 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 are covered. A final project will consist of adjusting survey data.

CIVL - 6113 Environmental Tech Concepts, 3.00 Credits
Prerequisite(s): MATH 1033 with D or better
Level: Upper
This course focuses on environmental technology systems. Topics covered in the course include: basic environmental concepts, water quality, water pollution, drinking water, stormwater management, wastewater treatment, municipal solid waste, hazardous waste, air pollution, noise pollution, erosion control and environmental assessments. The student will analyze a site plan to determine the "best practice" solutions to storm water management challenges using industry standards. 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
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 - 6212 Construction Safety, 2.00 Credits
Prerequisite(s): CIVL 3553 with D or better or ARCH 4014 with D or better
Level: Upper
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
The foundation of this course is the development of an estimating database. Students will use data base estimating software in construction estimating. Students will gain experience in estimating commercial building projects and heavy civil projects, as well as lump sum and unit price contract estimating. The course will involve several project based learning experiences.

CIVL - 7001 Sr Seminar & Project Design I, 1.00 Credit
Level: Upper
Applied Learning-Creative Work
This course is the first of a two semester sequence required for all Land Surveying Engineering Technology Bachelor seniors. Students design and implement a technical project for completion of 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 2043 with D or better
Level: Upper
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 - 7104 Land Development and Design, 4.00 Credits
Prerequisite(s): CIVL 2204 with D or better and MATH 2043 with D or better
Level: Upper
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 calculations, 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. Laboratory experiences will include experiments related to fluid flow, computer analysis of laboratory data, and computations including the development of spreadsheet programs to be used in the designs covered.

CIVL - 7114 Geographic Information Systems, 4.00 Credits
Prerequisite(s): CIVL 3214 with D or better
Level: Upper
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
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 the 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
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 Business and Law, 3.00 Credits
Prerequisite(s): COMP 1503 with D or better *
Level: Upper
Study of specific contract clauses that are common in construction contracts including change orders, differing site conditions, construction delays, liquidated damages, construction claims and dispute resolutions. Students will read construction contract disputes and determine reasonable outcomes based on the given fact patterns. Additionally students will be introduced to the business of construction through construction job site cost accounting.

CIVL - 8003 Sr Seminar & Project Design 2, 3.00 Credits
Prerequisite(s): CIVL 7001 with D or better
Level: Upper
Applied Learning-Creative Work
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 - 8104 Global Positioning Systems, 4.00 Credits
Prerequisite(s): CIVL 3214 with D or better
Level: Upper
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 4144 with D or better
Level: Upper
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.