# LAND SURVEYING/GEOMATICS

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**SUR 255 Introduction to Mine Surveying 3 Credits**
Surface and underground surveying techniques specifically applied to mineral exploration and mining operations. Prerequisite:

**SUR 280 Fundamentals Geomatics I 4 Credits**
A comprehensive study of angle measurement systems, taping, the traverse, differential leveling, profile leveling, plan and profile sheet, the circular curve, the vertical curve, the USGS 7.5 minute map, and elementary topographic mapping. The application of statistics to surveying, the assumptions underlying surveying on the plane, and reference surfaces are stressed in this course. In the laboratory portion of the course, students will make survey measurements, maintain a field book, and adjust survey data as appropriate. Weekly laboratory reports using the measured data to compute a survey product are required. Lecture+Lab: 3+3. Four semester hours. Prerequisite: Must have completed (MATH 127 or MATH 128) and be enrolled in or have completed STAT 152 and CADD 121.

**SUR 281 Fundamentals Geomatics II 4 Credits**
A comprehensive study of the construction and calibration of the modern total station, instrument errors, face positions, survey astronomy, control leveling, calibration of the EDMI, large-scale topographic mapping, and the use of the data collector. In the laboratory portion of this course, students will apply the fundamental principles underlying total station instrument errors, EDMI calibration, astronomic observations for azimuth and large-scale topographic mapping. Weekly laboratory reports using measured data to compute a survey product are required. Lecture+Lab: 3+3. Four semester hours. Prerequisite: Must have completed SUR 280.

**SUR 290 Intro Urban Development 4 Credits**
An introduction to the process of land development and construction layout. An emphasis is placed on those Nevada State Statutes that define the duties of the Professional Land Surveyor in the subdivision of land. The laboratory portion of the course provides practical exercises involving Topographic Mapping, ALTA/ACSM Title Surveys, Standards of Practice, Elevation Certificates, and Subdivision Design. Lecture+Lab: 3+3. Four semester hours. Prerequisite: Must have completed CADD 121.

**SUR 320 GIS for Surveyors 3 Credits**
Reviews the basic concepts in the development and use of Geographic Information Systems (GIS). The course focuses on the application of GIS for land parcel management or the Land Information System (LIS). Applies measurement science to the collection of land information data and the development of the base map. Develops the legal issues associated with the development of land information systems. Introduces the concept of the cadastre and the history associated with land parcel management in the United States. Prerequisite: Must have completed GIS 109.

**SUR 330 Intro Least Square Adjust 3 Credits**
This course provides an introductory study of the concepts and mathematics involved in performing least squares adjustment of survey data. The student is introduced to the use of matrices to handle data, systems of linear equations, the use of the Taylor series to linearize equations, the principles of error propagation, and several methods used to fit survey data to mathematical and survey models. Prerequisite: Must have completed MATH 181.

**SUR 340 Photogrammetry/Remote Sensing 3 Credits**
Principals of photogrammetry and remote sensing as applied to surveying and mapping. Includes the mapping camera, the photograph, the stereo model, the strip and the block, and flight planning principles. The impact of the digital revolution on photogrammetry, image processing, and remote sensing principles are important topics covered in this course. Prerequisite: Must have completed (MATH 127 or MATH 128) and (PHYS 151 or PHYS 180).

**SUR 360 Public Land Survey System 3 Credits**
The U.S. Public Land Survey System (PLSS) as described in Official Government Survey Manuals (1851-1973) with emphasis on evidence, both federal and state rules, resurveys, and subdivision of sections. A field project to recover original evidence of the GLO Surveys is required. Prerequisite: Must have completed MATH 127 or MATH 128.

**SUR 365 Land Descriptions 3 Credits**
Analysis, interpretation, and writing of land descriptions, proper form, controlling elements, metes-and-bounds, sectionalized land descriptions, easements, and right-of-way. Considerations of the parent title, interpretation of expressions, bounds calls, different types of descriptions, junior-senior rights in descriptions, title considerations, and research of public and private records. Prerequisite: Must have completed SUR 360.

**SUR 440 Geodetic/Gps Surveying 3 Credits**
Introduces geometric reference to ellipsoids, ellipsoidal and local coordinate systems, coordinate transformation in 2D and 3D, datums and datum transformations, orthometric heights, the reduction of field observations, effects of the earth's gravitational field, state plane coordinate systems, and GPS network design. The student is expected to design a GPS network, collect the data, and process the data to extend control to unknown project control stations. Prerequisite: Must have completed SUR 281 and SUR 330 and (PHYS 152 or PHYS 181).

**SUR 450 Construction Surveying 3 Credits**
Prepares students for organizing, planning, and cost estimating for construction and civil engineering projects. Topics include intersections, horizontal curve, spiral curves, vertical curve fitting, route design elements, cross sections, volumes, and other pertinent topics. Prerequisite: Must have completed SUR 281 and SUR 290.

**SUR 460 Adv Boundary Analysis 3 Credits**
Study of boundary resolution where occupation and possession are not consistent with the record location. Study of unwritten property rights and the presentation of defensible evidence. Review of principles of land tenure and the cadastre, the Statute of Frauds, constructive notice, recording laws, and water boundaries. Prerequisite: Must have completed SUR 365.

**SUR 495 Survey/Geomatics Capstone 3 Credits**
Final student project requiring the application of knowledge and skills acquired in previous field experience and coursework. Project may include field/office evidence research, urban subdivision layout, descriptions, map/plat construction, and/or a directed undergraduate research project. Includes the creation of a student portfolio or project report. Prerequisite: