

CERTIFICATE IN GLOBAL POSITIONING SYSTEM (GPS) TECHNOLOGY

THE PROGRAM

A revolution in the mapping and timing of the world is underway with the advent of Global Positioning System (GPS) technology. GPS has altered forever the surveying, navigational and mapping professions, and has created new markets for GPS applications such as agriculture, construction, archaeology, biology and recreation. This comprehensive certificate examines the principles, techniques and applications of GPS.

This certificate is for those entering the GPS field who need a solid grounding in GPS technology and science and for those who wish to better understand new developments such as RTK, CORS and DGPS, and survey data adjustment methodologies. Courses are developed and taught by nationally recognized GPS experts. Using state-of-the-art equipment, participants develop expertise needed in a variety of professions, including land surveying, engineering, GIS data collection, biology, flood control, public works, geology, geophysics, census data collection, parks and recreation, land management and public safety.

COMPLETION REQUIREMENTS

To earn the certificate, participants must successfully complete (grade C or better) nine courses (21.5 required units).

TRANSFER CREDIT

Up to 4 units of comparable courses may be transferred into the program upon approval from UCR Extension. Official transcripts are required.

FAQS

1. Do I need to be a surveyor to attend these classes?
No. Anyone who needs to learn more about GPS may benefit from these classes.
2. How much does it cost to complete the program?
Our best estimate of the total price (including books, tuition and parking) is \$3,800. This price is subject to change.
3. Is this Certificate approved for Veterans Education Benefits?
Yes, please call Julie at (951) 827-4105 for more information.
4. Is there a course sequence I need to follow?
It is recommended that you begin with Principles of GPS Technology. You may complete the program in a sequence that best fits your schedule.
5. Are there financial aid opportunities?
Yes, there are. Please visit www.extension.ucr.edu/aid.html.
6. Am I eligible for a tax credit?
You may be. Please visit www.extension.ucr.edu/tax.html.

ADMISSION

The program and courses are open to anyone who can benefit from university-level study, including persons who are not Certificate candidates but who are interested in specific topics.

PREREQUISITE

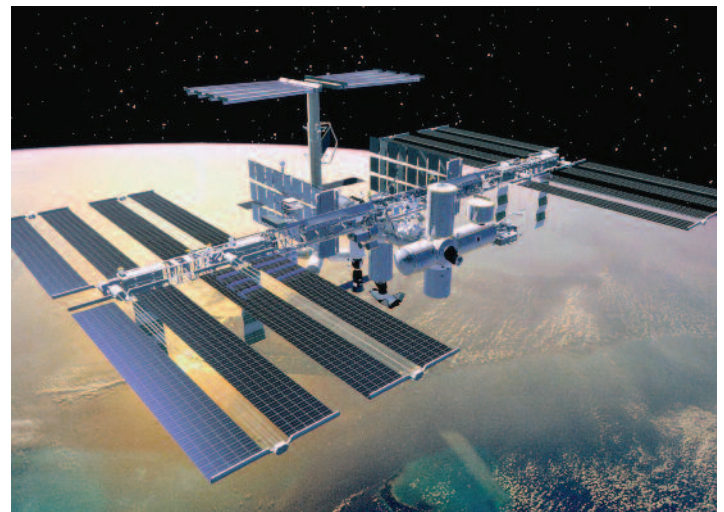
College-level math or completion of a surveyor program or course.

TO ENROLL IN THE CERTIFICATE PROGRAM

An enrollment form must be filed along with a nonrefundable fee of \$50. Courses taken prior to enrolling apply to the certificate but your completion requirements are those in effect when you apply. The nonrefundable fee covers academic advisement, tracking of progress/completion and updates on program changes and additions. Forms are available in Extension's quarterly catalog, at Student Services, in program department offices and on the Web site at www.extension.ucr.edu/certificates.

SCHEDULING OF CLASSES

Generally, Certificate candidates may complete the program within one year. Courses are offered in a variety of formats and times of day, including weeknights and weekends.



PROGRAM INFORMATION

Contact the Department of Science, Law & Health Programs:

Phone: (951) 827-5804

Fax: (951) 827-7374

E-mail: sciences@ucx.ucr.edu

Web Site: www.extension.ucr.edu/gis

CERTIFICATE PROGRAM at a glance

GLOBAL POSITIONING SYSTEM (GPS) TECHNOLOGY

REQUIRED COURSES

Principles of GPS Technology

ERT X440.1 (3 units)

This course presents an overview of the components of the GPS including: the GPS satellite signal structure; GPS orbits and tracking networks; GPS measurements and their properties and error characteristics; points and differential positioning; GPS receivers, their capabilities and limitations, and matching the receiver to a specific application.

Fundamentals of Geodesy

ERT X440.2 (3 units)

Geodetic science underpins any type of positioning using the global positioning system (GPS). A sound working knowledge of these principles helps to demystify the process of GPS surveying and positioning. The course provides an overview of geodesy, examines the fundamental goal of geodesy and introduces those geodetic concepts useful in better understanding GPS. Topics include geodetic datums and reference systems, satellite geodesy, geodetic quantities and transformation of terrestrial positions.

GPS Techniques: RTK, CORS and DGPS

ERT X440.3 (3 units)

This course examines how the various GPS positioning techniques work, their applications and limitations. Topics include point positioning, differential positioning, and precise relative positioning, including CORS and real-time kinematic (RTK) positioning. Included are hands-on field study exercises for participants to practice the various positioning techniques.

GPS Processing and Analysis

ERT X440.8 (3.5 units)

This course explores data handling (collection and processing) and data analysis and evaluation. Participants perform small surveys where data is collected in the field, downloaded, processed, analyzed and evaluated. The course also includes techniques for solving problems involving multipath error. The use of least squares method of data adjustment and analysis is examined.

Control Surveys Using GPS

ERT X440.4 (1.5 units)

The course addresses organizational design and observation planning to meet stringent control survey standards and specifications such as Federal Geodetic Control Subcommittee (FGCS) Standards, Specifications for Geodetic Control Networks and Geometric Accuracy Standards and Specifications for Using GPS Relative Positioning Techniques.

GPS Leveling

ERT X440.5 (1.5 units)

This course examines the concepts and techniques involved in geoid modeling as well as establishing precise ellipsoidal heights. Topics include fundamental relationships between heights, practical representation and use of regional and global geoid models, local geoid modeling by surface-fitting, network design and observing procedures for recovering high-accuracy ellipsoidal heights. Accuracy and limitations of the method are also explored.

Survey Data Adjustments

ERT X440.6 (1.5 units)

This course presents the basic concepts of errors in survey measurements and their statistical properties, the propagation of error, and the least-squares adjustment method as applied to GPS and control networks. Participants generate GPS data and perform step-by-step analysis and adjustment.

Map Projections

ERT X440.9 (1.5 units)

This course explores the general characteristics of map projections such as the projection families, tangency and case, aspects and perspectives, and the principles and mathematical calculations involved in transforming latitude and longitude into the State Plane Coordinate System (SPCS).

GIS Data Capture Using GPS Technologies

ERT X453.6 (3 units)

This intensive and hands-on course discusses data correction techniques, geodesy, data collection techniques, and GPS to GIS applications. For geographers, GIS project managers, field technicians and others involved in data capture for GIS.