NEW! Geographic Information Technology (GIS/GPS)

See also Geographic Information Systems courses, page 40

LSU Professional Development and the LSU Center for Geoinformatics are pleased to announce the following course offerings to address the continuing professional development needs of professional engineers and professional land surveyors. All courses qualify for continuing education units (CEUs) and professional development hours (PDHs) to maintain your license.

For Louisiana State Board professional development hour (PDH) information call: 225/925-6291 (www.lapels.com).

For more information about the GIS/GPS Course Series, contact Kristy Anthony at 225/578-3313 or kanthony@doce.lsu.edu.

Introduction to the Global Positioning System

The Global Positioning System (GPS) has revolutionized the way that we map, survey and locate ourselves. Surveys that once took several days can now be completed in a matter of hours with accuracies 10 to 100 times higher. GPS has become an essential navigation and traffic management system, enhanced the efficiency of farming and construction equipment, transformed the mining, engineering, forestry, and agriculture industries, and advanced the efficacy of public services.

This course introduces you to the basic concepts and principles of map projections, coordinate systems, ellipsoids, geoids, horizontal and vertical datums, and two and three-dimensional transformations. You will learn the importance of these concepts and their proper use in mapping applications and data capture applications such as the global positioning system. A historical background will also be presented. This course is ideal for individuals working in surveying and/or mapping fields or wishing to gain additional knowledge of datums and coordinate systems and their relation to the global positioning system.

Major topics to be presented include:

- Understanding the Global Positioning System—learn about the technology and its structure.
- How GPS is used to determine 3-D positions—learn how GPS calculates distances and positions.
- Levels of precision and accuracy—understand the different levels of accuracy and precision and the requirements to achieve those accuracies and precision.
- What about Reference frames?—learn about the current status of reference frames and their importance.
- GULFNet CORS—learn about the national standard CORS (Continuously Operating Reference System) that provides enhanced 3-D positioning.

This seminar is ideal for:

- Individuals who are new to or who would like to gain additional knowledge of GPS technology.

Key benefits of participation:

- Learn the power of the positioning technology as an exploring, mapping and as an essential tool in several industries and numerous applications.
- Understand the methodology behind the technology.
- Understand key requirements to achieve a variety of endeavors.

Seminar Leader: Dr. Roy Dokka, LSU College of Engineering. Dr. Dokka is the Fruehan Endowed Professor of Engineering at Louisiana State University. He also serves as Executive Director, Center for Geoinformatics and Director for the Louisiana Spatial Reference Center (LSRC). The LSRC is a partnership with the National Geodetic Survey-NOAA focused on creating a state-of-the-art positional infrastructure for the region. Dr. Dokka is a Fellow of the Geological Society of America and was awarded a lifetime honorary membership in Alpha Lambda Delta, the National Freshman Honor Society. He is currently past-president of the South-Central Section of the Geological Society of America.

Course Code: CG100 Fee: $195 CEUs: 0.35
Session 06–1: Mar. 10; Fri.; 8:30 A.M.–12 Noon (1 mtg.)

Datums and Coordinate Systems of Louisiana

Datums and coordinate systems are part of the foundation for mapping, surveying and positioning. Identifying and comprehending appropriate parameters are paramount factors in sound mapping, accurate surveying and precise positioning projects.

This course introduces you to the basic concepts and principles of map projections, coordinate systems, ellipsoids, geoids, horizontal and vertical datums, and two and three-dimensional transformations. You will learn the importance of these concepts and their proper use in mapping applications and data capture applications such as the global positioning system. A historical background will also be presented. This course is ideal for individuals working in surveying and/or mapping fields or wishing to gain additional knowledge of datums and coordinate systems and their relation to the global positioning system.

Major topics to be presented include:

- Understanding map projections—learn about map projections and map projection selection factors.
- Coordinate system characterization and use—understand coordinate systems, their purpose, applications, and proper use.
- Understanding horizontal datums and principal related factors—learn how horizontal datums are defined, their relation to map projections, coordinate systems, ellipsoids, geoids, horizontal measurements, and their overall significance.
- Understanding vertical datums and principal related factors—learn how vertical datums are defined, their relation to map projections, coordinate systems, ellipsoids, geoids, height measurements, and their overall significance.
- Transformation techniques and factors—understand transformation considerations, methods, parameters, and accuracies.
- Historical aspect of datums and coordinate systems—learn how datums and coordinate systems evolved over time.

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This seminar is ideal for:
- Individuals working in surveying and/or mapping fields or wishing to gain additional knowledge of datums and coordinate systems and their relation to the global positioning system.

Key benefits of participation:
- Understand the significance of map projections, coordinate systems, datums, and transformations in mapping and data capture applications.
- Learn the connection between map projections, coordinate systems, datums, ellipsoids, geoids, and transformations.
- Understand the selection of appropriate parameters for your application.

Recommended Prerequisite: Concurrent registration in Introduction to the Global Positioning System or equivalent knowledge.

Seminar Leader: Cliff Mugnier, LSU College of Engineering. Cliff Mugnier is an Honorary Member of the Louisiana Society of Professional Surveyors and he is the National Assistant Director of the Photogrammetric Applications Division of the American Society for Photogrammetry and Remote Sensing. He is a board-certified Photogrammetrist and board-certified Mapping Scientist. Cliff teaches surveying, photogrammetry and geodesy in the Department of Civil and Environmental Engineering at Louisiana State University. He is Chief of Geodesy at the LSU Center for GeoInformatics. He has authored numerous papers, reports, columns and book chapters. He has had a regular monthly column, “Grids and Datums,” in Photogrammetric Engineering and Remote Sensing since 1997. And, he started an additional column, “Observations on Positions,” in Professional Surveyor magazine in early 2004.

Course Code: CG120    Fee: $395   CEUs: 0.7

Session 06–1: Apr. 7; Fri.; 8:30 A.M.–4:30 P.M. (1 mtg.)

Precise 3-D GPS Positioning with GULFNet

The ability of the Global Positioning System (GPS) to accurately determine three-dimensional position (horizontal coordinates and elevation), velocity and time anywhere on earth has led to an explosion in high precision applications. A key component in high precision positioning requires the integration of reference stations of the National Spatial Reference System commonly known as Continuously Operating Reference Stations (CORS). Louisiana State University operates the GULFNet system, the official Louisiana component of CORS.

This course will teach you extensively about the theory of GPS, the use of the CORS network, and practical methods in data collection. You will also appreciate its applicability and potential for various mapping projects. You will understand National Geodetic Survey (NGS) standards and requirements for project planning and its significance, data collection methodology, validation, and adjustment processing.

Major topics to be presented include:
- Understanding the principles of GPS—learn about the fundamental principles of high precision, three-dimensional positioning.
- The role of Continuously Operating Reference Stations (CORS)—understand the role, value, and the high precision that the CORS stations bring to the State of Louisiana and the nation.
- Gaining essential project planning skills—learn to determine the information necessary to carry out a successful project.
- Learning data collection methods—learn about GPS data techniques.
- Performing analysis of data collected—understand how to perform the necessary tasks at the office following field-data collection.
- Validation using the NGS On-line Positioning User Service (OPUS)—learn to validate data collected using the NGS OPUS tool.
- Adjusting the data using the NGS ADJUST software package—learn how to make appropriate adjustments using the NGS ADJUST software tool.

This seminar is ideal for:
- Individuals who require the knowledge of high precision data collection processes using a GPS.

Key benefits of participation:
- Learn the methods and requirements for high precision data collection using the GPS.
- Understand the importance of data collection project preparation.
- Understand key requirements to achieve high precision.
- Learn how to analyze and validate the data collected.

Recommended Prerequisites: Introduction to the Global Positioning System; Datums and Coordinate Systems of Louisiana; or equivalent knowledge.

Seminar Leaders: Dr. Roy Dokka, Cliff Mugnier, and Imtiaz Hossain, LSU College of Engineering.

Course Code: CG150    Fee: $395   CEUs: 0.7

Session 06–1: May 26; Fri.; 8:30 A.M.–4:30 P.M. (1 mtg.)

Advanced Mapping Using a Hand-Held GPS/Data Logger

The Global Positioning System (GPS) provides users with the means to accurately determine three-dimensional positions (horizontal coordinates and elevation), velocity and time, thus providing an excellent basis for diverse mapping.

This course will provide you with essential GPS skills that will allow for mapping points, lines and areas. You will learn and carry out project planning, pre-field collection preparations, field data collection, post-field data reduction, and map production and presentation.
Major topics to be presented include:

• Overview of methods—glance at the methods used.
• Understanding project planning considerations—learn to organize project objects, define project requirements and select the appropriate spatial datum and measurement tools.
• Learning pre-field collection preparations—gain skills in creating the data dictionary for your project, configuring the data logger, integrating with ancillary data, and Global Positioning System survey planning.
• Collecting field data using a hand-held GPS/data logger—learn the initialization process of the GPS unit for effective data capture and point, line and polygon mapping techniques.
• Performing post-field data reduction—learn to proficiently transfer data to office PC, differentially correct the data captured in the field, and apply quality control/quality assurance routines to evaluate the accuracy of the data acquired.
• Producing and presenting map outputs—create quality output products for presenting data captured and analyzed.

This seminar is ideal for:

• Individuals involved in mapping who would like to acquire the skills for high precision data collection in conjunction with a GPS.

Key benefits of participation:

• Learn the methods and requirements for mapping using the Global Positioning System.
• Learn how to prepare for data collection, capture field data and properly process the data acquired.
• Learn how to create effective output products for data visualization.

Recommended Prerequisites: Introduction to the Global Positioning System; Datums and Coordinate Systems of Louisiana; or equivalent knowledge.

Seminar Leaders: Dr. Roy Dokka and Dina Sa, LSU College of Engineering.

Course Code: CG200  Fee: $795  CEUs: 1.4

For schedule information, contact Kristy Anthony at 225/578-3313 or kanthony@doce.lsu.edu.

GPS Real-Time Kinematic (RTK) Surveying

Tremendous operational improvements to GPS-based surveying offer flexibility, efficiency, expeditious and cost-effective data collection. Differential GPS (DGPS) carrier phase technology can yield centimeter accuracies providing genuine functionality to mobile applications such as real-time kinematic (RTK) surveying. This course will teach you the theory and methodology behind differential kinematic surveying. You will understand the requirements and significance of project planning, data collection methodology and post-processing routines.

Major topics to be presented include:

• Understanding RTK fundamentals—learn the theory behind real-time kinematic surveying.
• Understanding the requirements for RTK surveying—gain essential knowledge needed for project preparation.
• Applying RTK criteria to a survey project—learn how to apply RTK criteria and to create tools for data collection.
• Conducting a GPS RTK survey—apply coordinate system and site calibration theory to a RTK survey.
• Operating the RTK system components—learn to set-up the control network in the RTK system.
• Understanding field data collection procedures—understand stop-and-go, kinematic and real-time kinematic methods.
• Performing office data processing—learn and perform data post-processing techniques.

This seminar is ideal for:

• Individuals who require the knowledge of RTK technology, data collection process and data post-processing.

Key benefits of participation:

• Learn how to apply and conduct RTK surveying.
• Gain essential project planning skills.
• Understand the importance of data collection preparation.
• Understand key requirements to achieve a precise survey.
• Learn how to post-process data collected.

Recommended Prerequisites: Introduction to the Global Positioning System; Datums and Coordinate Systems of Louisiana; or equivalent knowledge.

Seminar Leaders: Dr. Roy Dokka, Cliff Mugnier, and Imtiaz Hossain, LSU College of Engineering.

Course Code: CG250  Fee: $795  CEUs: 1.4

For schedule information, contact Kristy Anthony at 225/578-3313 or kanthony@doce.lsu.edu.