

SE 413 Satellite Geodesy and Geo-positioning

Credit and Contact hours	3 / 2 (Lectures), 1 (Tutorials), 2 (Laboratory)																					
Required, or Elective	Required for a BSCE degree																					
Course Description	Introduction to satellite positioning; satellite orbits; signal propagation & errors; surveying by satellite geodesy; GNSS data processing & transformation; Augmentation systems; GPS modernization; GNSS systems; GNSS applications; computer applications.																					
Prerequisites or Co-requisites	SE 314																					
Course Learning Outcomes	Students completing this course successfully will be able to <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Course Learning Outcomes</th> <th style="width: 30%;">Related Student Outcomes (SO)</th> </tr> </thead> <tbody> <tr> <td>CLO1: Explain the principles of Satellite Geodesy</td> <td>SO1</td> </tr> <tr> <td>CLO2. Implement GNSS networks , collecting, processing and analyzing GNSS observations</td> <td>SO6</td> </tr> </tbody> </table>		Course Learning Outcomes	Related Student Outcomes (SO)	CLO1: Explain the principles of Satellite Geodesy	SO1	CLO2. Implement GNSS networks , collecting, processing and analyzing GNSS observations	SO6														
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CLO1: Explain the principles of Satellite Geodesy	SO1																					
CLO2. Implement GNSS networks , collecting, processing and analyzing GNSS observations	SO6																					
Student Outcomes	SO1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics, and using modern engineering tools [ABET 1]. SO 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions																					
Topics Covered	<table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">List of Topics</th> <th style="width: 30%;">Related CLOs</th> </tr> </thead> <tbody> <tr><td>Overview of GPS</td><td>CLO1</td></tr> <tr><td>Satellite orbits</td><td>CLO1</td></tr> <tr><td>GPS observables</td><td>CLO2</td></tr> <tr><td>GPS errors</td><td>CLO2</td></tr> <tr><td>Surveying with GPS</td><td>CLO2</td></tr> <tr><td>Data processing</td><td>CLO2</td></tr> <tr><td>Coordinate systems</td><td>CLO1</td></tr> <tr><td>GPS Heighting</td><td>CLO1</td></tr> <tr><td>Augmentation systems</td><td>CLO1</td></tr> </tbody> </table>	List of Topics	Related CLOs	Overview of GPS	CLO1	Satellite orbits	CLO1	GPS observables	CLO2	GPS errors	CLO2	Surveying with GPS	CLO2	Data processing	CLO2	Coordinate systems	CLO1	GPS Heighting	CLO1	Augmentation systems	CLO1	
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	GPS modernization	CLO1
	GLONASS, Galileo and Compass	CLO1
	Precise Point Positioning	CLO2
	Indoor Navigation	CLO1
Textbook(s) and Other Required Material	Textbook: 1- B. Hofmann-Wellenhof, Herbert Lichtenegger, and James Collins, "GPS Theory and Practice", 5th ED. 2001. Springer. 2- Bernhard Hofmann-Wellenhof, Herbert Lichtenegger, Elmar Wasle . "GNSS – Global Navigation Satellite Systems". Springer.2008	
Grading System	Tutorials 15% Field work reports 15% 2 Mid-Terms 30% Final Exam 40%	
Instructors	Dr. Ashraf Farah (2A73/2); e-mail: afarah@ksu.edu.sa - (1 st & 2 nd Semester 20-21)	
Date of Review	Nov, 2020	