Academic Year: 2023-2024	Semester: Fall	Starting Date: 15-10-2023

Course Name	**Advanced Surveying Engineering**
Module Language	**English**
Instructor	**Asst. Prof. Dr Mohammed Anwer Jassim**
Teaching Assistance(s)	None
College/University	College of Engineering – Salahaddin University-Erbil
Department	Geomatics Engineering
Semester Duration	15 weeks
Course Overview	▪ The importance of studying this course is to give the postgraduate student's supplementary knowledge that emphases the basics that he had in BSc stage. ▪ In this course student will get a review of the concept of general field surveying operations and advance applications. ▪ The major area of the course is the learning of fundamental horizontal networks (Triangulation - Trilateration), Main methods of adjustment the control networks, assessment and accuracy of the positions, Position error ellipse, Monitoring systems for construction surveying purposes. ▪ Fundamental of tunnel surveying, monitoring the TBM systems for tunnel construction, Mining surveying systems. ▪ Fundamental of hydrographic surveying, The main systems of horizontal fixing, Acoustic systems for hydrographic surveying, Hypack system. ▪ The course will add a good skills and knowledge that can make a difference in availability of wide range and secure employments for the postgraduate engineers, since they can be a candidate for an academic staff.
Course Objectives	This Course aims to the following points: 1- Teaching the postgraduate students the advance skills of assessment of the horizontal networks in different orders. 2- Teaching the postgraduate students the advance applications of underground surveying. 3- Teaching the postgraduate students the advance applications and operations of hydrographic surveying.
Course Contents	Week Lecture 1st Introduction, Triangulation & Trilateration: 2nd Classification, Standards & Classification. 3rd Well Conditioned Triangle. 4th Strength of figure of Triangulation Networks. 5th Adjustment Methods of Horizontal Position. 6th Parametric Method of Position Adjustment. 7th Condition Method of Horizontal Position. 8th Position's Error Ellipse. 9th Midterm Exam 10th Mine & Underground Surveying. 11th Mine & Underground Surveying.

	12th Hydrographic Surveying. 13th Hydrographic Surveying. 14th Seminar Presentation 15th Final Exam
Textbooks and References	1 – Charles D. Ghilani and Paul R. Wolf. Elementary surveying an introduction to geomatics. 13 Edition, 2012. 2 – Raymond E. Davis, France S. Foote, James M. Anderson and Edward M. Mikhail. Surveying Theory and Practice. Sixth edition, 1981. 3 – Schofield W. and Bearch M. Sixth edition. 4- Odom Hydrographic Systems, Inc., 8178 GSRI Road, Building B, Baton Rouge, LA. 5- US Army Corps of engineering. 1994 Hydrographic surveying: Engineering and design. Washington DC, US Army Corps of Engineers. 6- Coastal Oceanographic, Inc (HYPACK MAX) 11-G Old Indian trail, Midfield, CT.
Teaching Style	3 hrs. in Class
Requirements for credit points	For the award of credit points, it is necessary to pass the module exam. It contains: An examination during the academic semester, Quizzes, Assignments, and Final examination. **Student's attendance is required in all classes**.
Credit ECTS	6
Grade Distribution	The following grade system is used for the evaluation of the module exam: The module exam is based on the summation of two categories of evaluations: **First: (50%)** of the mark is based on the academic semester effort which includes - Midterm Exam = 20%. - Quizzes = 10% - Seminar = 5% - Review Article = 15% **Second: (50%)** of the mark is based on the final examination that is comprehensive for the whole of the study materials reviewed during the academic semester.
Workload	Workload 10hrs/w (150hrs/s): Contact face-to-face 3hrs/w (45hrs/s) and Non-Contact Self learning 7hrs/w (105hrs/s)