



**Department of: Geomatics (Surveying) Engineering.**

**College of: Engineering.**

**University of: Salahaddin-Erbil.**

**Subject: Hydrographic Surveying.**

**Course Book: (Forth Stage).**

**Lecturer's name: Ass. Prof. Dr Mohammed Anwer.**

**Academic Year: 2021/2022**

# Course Book

<b>1. Course name</b>	<b>Hydrographic Surveying</b>
<b>2. Lecturer in charge</b>	<b>Dr Mohammed Anwer</b>
<b>3. Department/ College</b>	<b>Geomatics (Surveying) Engineering / Engineering</b>
<b>4. Contact</b>	<b>e-mail: mohammed.jassim@su.edu.krd Tel: (optional)</b>
<b>5. Time (in hours) per week</b>	<b>Theory: 2</b>
<b>6. Office hours</b>	<b>6</b>
<b>7. Course code</b>	<b>ES405</b>
<b>8. Teacher's academic profile</b>	<p>a) Institution: State University of Land Use Organization. Location: Moscow –Russian Federation. Completion Date: February 1995. Degree: Doctor Philosophy in applied sciences of surveying engineering. Dissertation titled: "The accuracy analysis of surveying works for establishing city cadastre".</p> <p>b) Institution: Technical Institute of Tashkent. Location: Tashkent – Uzbekistan republic, USSR. Completion Date: July 1991. Degree: MSc in science of surveying - thesis titled: "Accuracy analysis of city cadastre applications in Iraq".</p> <p>c) Institution: Baghdad University – College of Engineering. Location: Baghdad, Iraq. Completion Date: July 1985. Degree: BSc in science of engineering surveying</p> <ul style="list-style-type: none"> <li>● Member of the college's committee for the MSc &amp; PhD studies.</li> <li>● Member of college's syllabuses and study programs committee.</li> <li>● Member of the department's scientific committee.</li> <li>● Member of the college's final examinations committee.</li> <li>● Lecturer of MSc courses for the subjects "advance surveying, and advance global geodesy".</li> <li>● Lecturer of BSc subjects: hydrographic surveying, adjustment theory, global geodesy, estimation &amp; quantity surveying, theory of errors, map projections, and surveying-I.</li> </ul>
<b>9. Keywords</b>	<b>Tide, Echo sounding, SBES, MBES.</b>
<b>10. Course overview:</b>	<ul style="list-style-type: none"> <li>▪ The importance of studying hydrographic surveying course is to learn the students one of main branches of geomatics that emphasizes the knowledge and skills of water depth measurement and extraction of sea floor model.</li> <li>▪ In this course we have to understand the main hydrographic methods, and methods of horizontal control fixing, and techniques of vertical control fixing. Such methods are mainly depend on the shore, off-shore, both shore and off-shore observations. Add to that, the understanding of the basics of echo sounding methods.</li> </ul>

- In this course we have to learn the principle of horizontal position of the sounding points (like principle of traditional methods, radio systems, GPS systems) as well as, the basic principles of tides and methods of tide gauges.
- The major area of the course is the echo sounding technique and its methods. The basic corrections for the depth measurements using echo sounding systems. As an application of the echo sounding systems, the course takes the HYPACK system type of SBES transducer.
- The course will add a good skills and knowledge that can make a difference in availability of secure employments for the graduated engineers, since the surveying engineering department in our college is the pioneer in Kurdistan region in field of hydrographic surveying.

### **11. Course objective:**

This Course aims to the following points:

- 1- Teach the students in our department about the hydrographic surveying as a main branch of geomatics speciality.
- 2- Teaching the students the skills of design and implement the projects of hydrographic surveying that is necessary for different engineering fields.
- 3- Emphases the knowledge of hydrographic systems and its applications.

### **12. Student's obligation**

Final and midterm examinations that represent the main assessment of the obtained output.

Homework assignments are to assist in the learning of course material, so the discussion of homework among students will encourage them.

Closed book quizzes will consist of comprehensive quantitative problems that relate to any of the subjects covered during the semester.

There is a specific penalty for missing a class; however, students are responsible for the content of each lecture, which may or may not be contained in the textbook. In-class illustrative problems are expected to be worked on during the scheduled class time; thus, students must present during these class sessions to receive credit for these assignments.

### **13. Forms of teaching**

Many methods may be used to transfer the information to the students mind. To begin with, at the beginning of the lecture the main subject and the main goals must be explained clearly on the white board or using other tools or manners.

The topics of the lecture must be going in a scientific logic sequence, in order to stating the subject in more understandable methods.

During the lecture an explanation will be done, and the student can ask any question related with the subject of the lecture then he will get a satisfied answers. Worked out examples and problems, should be solved on the white board in order to consolidate the understanding and to cover all sides of the subject.

In order to make a feedback, a discussion between the lecturer and the students should takes up during the applications or examples solving.

In practical lectures we have to show the student the main parts of Hypack-system and the essential steps of installation as a hardware part of practical. Then we have practical of pre-surveying settings for the software of Hypack. An applications and measurements have to be done during the practical lectures.

### **14. Assessment scheme**

Breakdown of overall assessment and examination

Examination	Approximate Date	Mark (%)
Midterm Exam	February	30
Activities & quizzes	End of each topic	10
Final Examination	June	60
Total Mark		100

**15. Student learning outcome:**

- 1- The student knew the main classification of the hydrographic surveying projects.
- 2- The student learn the main methods of the sounding horizontal position, as observations from the shore, off-shore, and from both shore/ off-shore.
- 3- The student knew the main types of tides, and its main patterns.
- 4- The student learns the principle of the acoustic measurements and echo sounding.
- 5- The student learns the computation of transducer characteristics and its properties.
- 6- The student knew the calculations of size, shape, and resolution of the used transducer.
- 7- The student learn the main sources of errors in hydrographic surveying and the main sounding corrections.

**16. Course Reading List and References:**

- Higher Surveying By Dr Chandra.
- Odom Hydrographic Systems, Inc., 8178 GSRI Road, Building B, Baton Rouge, LA.
- International hydrographic organization (IHO), 4 quai Antoine 1 er, BP 445 MC 98011 Monaco Cedex.
- US Army Corps of engineering. 1994 Hydrographic surveying: Engineering and design. Washington DC, US Army Corps of Engineers.
- Inner space technology Inc, 36 Industrial park, Waldwick, NJ.
- Coastal Oceanographic, Inc (HYPACK MAX) 11-G Old Indian trail, Midfield, CT.

<b>17. The Topics:</b>	<b>Lecturer's name</b>
Hydrographic Standards & Classification	Dr Mohammed A. - 4 hours September - 2021
Locating sounding from the shore	Dr Mohammed A. - 8 hours Sep. - 2021
Locating sounding from the boat.	Dr Mohammed A. - 12 hours October - 2021
Radio systems for horizontal fixing.	Dr Mohammed A. - 8 hours Oct. & Nov.- 2021
GPS methods of locating sounding	Dr Mohammed A. - 8 hours Nov. - 2021
Tides	Dr Mohammed A. - 2 hours Nov. - 2021
Tide gauges	Dr Mohammed A. - 4 hours Nov. - 2020
Reduction of Sounding	Dr Mohammed A. - 2 hours. Nov. - 2020
Worked out Examples	Dr Mohammed A. - 1 hour Nov. - 2021
Principle of Acoustic measurement	Dr Mohammed A. - 2 hours Dec. - 2021
Sound Velocity in water	Dr Mohammed A. - 2 hours Dec. - 2021
Bar check Calibration	Dr Mohammed A. - 2 hours Dec. - 2021
Echo sounder operation	Dr Mohammed A. - 2 hours Dec. - 2021
Single Beam echo sounding	Dr Mohammed A. - 2 hours Dec. - 2021

Resolution of S.B. echo sounder	Dr Mohammed A. - 2 hours Dec. - 2021
Sea bed Coverage	Dr Mohammed A. - 2 hours Dec. - 2021
Inclination correction	Dr Mohammed A. - 2 hours Dec. - 2021
Final Examination	Dr Mohammed A. - December - 2021

### 19. Examinations:

**1. Compositional:** In this type of exam the questions usually starts with Explain how

- Explain who the zero index of the transducer affects the Echo Sounder measurements.

**Answer:** The existing of the zero index in transducer means, the measured depth is not begin from the zero of transducer exactly, but from up or down of the zero level of the transducer. If the zero index is (+) it will cause sounding smaller than the correct one, and vice-versa in case of (-) zero index.

### 20. Extra notes:

### 21. Peer review

### پیداچوونہوہی ھاوہل

This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.

*(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).*

ئەم كۆرسىبووكە دەبىت لەلایەن ھاوئىكى ئەكادېمىيە سەير بىكرىت و ناوئوكى بابەتكەنى كۆرسەكە پەسەند بىكات و جەند ووشەيەك بنووسىت لەسەر شىاوى ناوئوكى كۆرسەكە و واژووى لەسەر بىكات.  
ھاوئەل ئەو كەسەيە كە زانىارى ھەبىت لەسەر كۆرسەكە و دەبىت پلەي زانستى لە مامۇستا كەمتر نەبىت.