Course Book

1. Course name	**Advanced Global Geodesy**
2. Lecturer in charge	**Asst. Prof. Dr Mohammed Anwer Jassim**
3. Department/ College	**Geomatics (Surveying) Engineering / Engineering**
4. Contact	**e-mail: mohammed.jassim@su.edu.krd**
5. Time (in hours) per week	**Theory: 3**
6. Office hours	**According to timetable**
7. Course code	
8. Teacher's academic profile	a) Institution: State University of Land Use Organization. Location: Moscow – Russian Federation. Completion Date: February 1995. Degree: Doctor Philosophy in applied sciences of surveying. Dissertation titled: "The accuracy analysis of surveying works for establishing city cadastre". 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". c) Institution: Baghdad University – College of Engineering. Location: Baghdad, Iraq. Completion Date: July 1985. Degree: BSc in science of engineering surveying ● Member of the college's committee for the MSc & PhD studies. ● Member of college's syllabuses and study programs committee. ● Member of the department's scientific committee. ● Member of the college's final examinations committee. ● Lecturer of MSc courses for the subjects "advance surveying, and global geodesy". ● Lecturer of BSc subjects: hydrographic surveying, adjustment theory, global geodesy, estimation & quantity surveying, theory of errors, map projections, and surveying-I.
9. Keywords	**Mathematical Geodesy, Astronomy, Satellite Geodesy.**

10. 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 mathematical geodesy and its advance applications, astronomical geodesy, time, and satellite geodesy.
▪ The major area of the course is the learning of Earth and Ellipsoid geometry, Oblate and Terrestrial spheroid, Spherical triangle, Coordinate reference systems and reference frames and datums (TRF& IRF), Geodetic datum, Projection onto spheroid, Reduction of

astronomical observations to the spheroid, Datum's transformation, Curves on the spheroid and Equation of Geodesic, Geodetic computations and Adjustment on spheroid.

▪ The Gravity, Geoid, and Potential, Gravimetric geoid models, Gravity measurement methods, Earth tide and Ocean tide, Determination of heights, Geopotential numbers and dynamic heights.

▪ The Astronomical Triangle, Systems of star coordinates, Positional astronomy, Astronomical observations, Time system, Accuracy of control networks, Astro-geodetic determination of geoid.

▪ 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.

11. Course objective:

This Course aims to the following points:

1- Teaching the postgraduate students the advance of mathematical geodesy.
2- Teaching the postgraduate students the advance of astronomical geodesy.
3- Emphases the knowledge of physical geodesy.

12. Student's obligation

During study of this course the postgraduate student must select a defined subject that tightly related with topics of this course to submit a paper as kind of simple research.
In this paper the student must regard the standard of research methodology and other scientific write requirements.
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.

14. Assessment scheme

Examination	Approximate Date	Mark (%)
Course Score		50
Final Examination		50
Total Mark		100

15. Student learning outcome:

1- The student able to understand the basics and advance knowledge of mathematical geodesy.
2- The student learning the principles and advance of the astronomy and astronomical geodetic systems.
3- The student learning the modern satellite technology and essential geodetic satellite systems.
4- Enhancement the student scientific aspects and approaches that aide him to find the subject of his theses.

16. Course Reading List and References:

– Bernhard Hofman-Wellenhof and Helmut Mortiz. Physical Geodesy. Springer wien New York, 2005.
– Calais E. Element of geodesy.
– Raymond E. Davis, France S. Foote, James M. Anderson and Edward M. Mikhail. Sixth edition, 1981.
- Xu, G. 2008. XVIII, 230 p, 26 illus., Hardcover.
- Fundamental of inertial navigation, satellite-based positioning and their integration. Noureldin A., Karamat, T.B., Georgy J., 2013.

17. The Topics:	Week No.	Date
Earth and Ellipsoid geometry – Basic definitions.	1	March 2024
Ellipsoidal Sections.	2	
Normal Sections.	3	
Curves on the spheroid and Equation of Geodesic.	4	
Geodetic computations methods.	5	April 2024
Coordinates Systems.	6	
Coordinates transformation.	7	
Astronomical Triangle & Positional astronomy.	8	May 2024
Laplace stations & Astronomical Azimuth.	9	
Time system.	10	
Gravity, Geoid, and Potential.	11	
Gravimetric geoid models & Gravity measurement methods.	12	June 2024
Final Course Examination	13	
	14	

19. Examinations:

20. Extra notes:

21. Peer review پێداچوونەوەی هاوەڵ

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 کۆرسبووکە دەبێت لەلایەن هاوەڵێکی ئەکادیمیەوە سەیر بکرێت و ناوەڕۆکی بابەتەکانی کۆرسەکە پەسەند بکات و جەند ووشەیەک بنووسێت لەسەر شیاوی ناوەڕۆکی کۆرسەکە و واژووی لەسەر بکات.

هاوەڵ ئەو کەسەیە کە زانیاری هەبێت لەسەر کۆرسەکە و دەبیت پلەی زانستی لە مامۆستا کەمتر نەبێت.