

Prerequisite status:  Advanced geographic information system	Unit Type:  Theoretical/practical	The number of units:  2	Name of the lesson:  <b>Digital models of the earth</b>
Type of additional practical training: Has it <input checked="" type="checkbox"/> does not have <input type="checkbox"/> Science travel <input type="checkbox"/> Laboratory <input checked="" type="checkbox"/> Workshop <input type="checkbox"/> Seminar <input type="checkbox"/>		The number of hours:  48	Expert professor to teach: GIS
<b>Goals:</b> Acquaintance with the method of collecting and producing digital height models and their use, The basics of the global positioning system, and how to use it			
<b>Headlines</b>  <b>1-</b> Definition, concept, and types of digital earth models  2- The models used in displaying the height and the stages of preparing digital models of the earth from different data sources  3- Principles and applications of interpolation (Types of interpolation methods including local and global methods. Deterministic and non-deterministic methods, problems and limitations of interpolation, interpolation based on geostatistics, Different stages of interpolation, quality evaluation methods in interpolation, Algorithms of interpolation of curve lines  4- Comparison and evaluation of different interpolation methods  5- Mathematical methods in interpolation (Using SPLINE and IDW in interpolation)  6- Analysis of digital height models (Matrix methods in analysis with digital height models. Algorithms for calculating the landscape's slope, direction, and other useful parameters with the help of digital height models. Modeling radiation and its spatial distribution, extraction of the waterways network  7- Applications of digital elevation models in remote sensing and environmental studies  8- Practical work: making a digital height model and analyzing it			
<b>Reference</b>  1- Valizadeh, Kamran, Behnam Khorrami. Shahriar Abbasi, Principles, Concepts and Analysis of Digital Earth Models, Satellite Publications, 2020  2- Li Zhilin et al., 2007, Earth Digital Modeling (Principles and Methods), translated by Hassan Azizi et al., Mah Hera Publications  3- Wilson John P., 2018, Environmental Applications of Digital Terrain Modeling (Analytical Methods in Earth and Environmental Science), Wiley-Blackwell.  4- El-Sheimy Naser, Caterina Valeo, et al., 2005, Digital Terrain Modeling: Acquisition, Manipulation and Applications, Artech House Publishers.			