

Prerequisite status: -	Unit Type: Theoretical - Practical	The number of units: 2	Name of the lesson: Geographic Information System and Remote Sensing in Urban Planning
Type of additional practical training: Has it <input checked="" type="checkbox"/> does not have <input type="checkbox"/> Science travel <input type="checkbox"/> Laboratory <input type="checkbox"/> Workshop <input checked="" type="checkbox"/> Seminar <input type="checkbox"/>		The number of hours: 48	
<p>General goals: Explaining the application capabilities of spatial information technology in urban planning and development.</p> <p>Behavioral goals: Learning application models and software related to spatial information systems and remote sensing and applying the learnings in research, studies, and urban development plans.</p>			
<p>Headlines</p> <p>1- Explaining the foundations of using geographic data and information (The elements of the geographic information system, the geometrical and descriptive nature of spatial data, spatial data structure, spatial database structure, the requirements for collecting, editing, and preparing spatial data, creating a geographic database and...)</p> <p>2- Application of spatial data description methods and spatial visualization in urban studies;</p> <p>3- Spatial analysis (vector and raster), spatial sampling and spatial statistics (Pattern analysis, geographic measurements, and geographic regression), Spatial interpolation and geostatistics, etc.;</p> <p>4- Spatial modeling (Digital terrain model, spatial decision modeling and multi-criteria evaluation, land use modeling, ecological modeling, network analysis, and...)</p> <p>5- Explaining the elements, processes, and nature of remote sensing data and analyzing the spectral behavior of urban and peri-urban phenomena;</p> <p>6- Visual and digital analysis and interpretation of satellite images (Principles of visual interpretation, preprocessing, enhancement, transformations, and classification of images)</p> <p>7- Analysis of urban issues using remote sensing data (Analysis of the form and urban sprawl, analysis of air pollution and heat islands, modeling and forecasting land use and land cover changes, analysis of green spaces and infrastructure, analysis of ecology and environment quality, analysis of environmental risks and...)</p> <p>8- Introducing approaches and innovations in spatial technologies and remote sensing.</p> <p>9- Practical project of application of geographic information system and remote sensing in urban planning.</p>			
<p>Reference</p> <p>1- Chandra, AM and Ghosh, S. K (2012) Remote sensing and geographic information system. Translated by Seyyed Kazem Alavipanah and Moslem Ledoni. Tehran University Publications.</p> <p>2- Shean, George. Z (2018). Applications of remote sensing for the urban environment. Translated by Hossein Nazmfar and Jafar Jafarzadeh. Shiran Nagar Publications.</p> <p>3- Fatemi, Seyyed Bagher, and Yousef Rezaei (2017). Basics of remote sensing. Free publications;</p>			

- 4- Ghahroodi, Manijeh and Amalsalma Babaei Fini (2015). An introduction to geographic information systems. Payam Noor University Publications.
- 5- Alijani, Bohlul (2019). Quantitative research method in geography. Samt Publications.
- 6- Ali Mohammadi, Abbas. (2016). Basics and science of geographic information systems. Side Publications. The seventh edition.
- 7- Campbell, J. E., & Shin, M. (2011). Essentials of geographic information systems. <https://www.Saylor.org/books/>.
- 8- Chang, K. T. (2008). Introduction to geographic information systems (Vol. 4). Boston: McGraw-Hill.
- 9- Grekousis, G. (2020). Spatial analysis methods and practice: describe–explore–explain through GIS. Cambridge University Press.
- 10- Liu, J. G., & Mason, P. J. (2016). Image processing and GIS for remote sensing: Techniques and applications. John Wiley & Sons.
- 11- Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). Geographic information science and systems. John Wiley & Sons.
- 13- Pradhan, B. (2017). Spatial Modeling and Assessment of Urban Form. SPRINGER INTERNATIONAL PU.
- 14- Scholten, H. J., & Stillwell, J. (Eds.). (2013). Geographical information systems for urban and regional planning (Vol. 17). Springer Science & Business Media.
- 15- Wang, X., & Hofe, R. (2008). Research methods in urban and regional planning. Springer Science & Business Media.
- 16- Weng, Q. (2019). Techniques and Methods in Urban Remote Sensing. John Wiley & Sons.
- 17- Zhu, X. (2016). GIS for environmental applications: a practical approach. Routledge.