

NEW IDEAS IN RANGE MANAGEMENT

(Remote Sensing Section)

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Program

This section of course assumes that participants have a basic knowledge of remote sensing principles and image processing, and covers more advanced topics in remote sensing. Topics to be covered in lectures/practicals include:

➤ Lecture 1

- **Lidar remote sensing:** Introduction, imaging Lidars, Lidar imagery, types of imaging Lidars, applications of Lidar imagery

Reference: Introduction to Remote Sensing, Campbell, J.B., 2007. Second Edition, Guilford Press-chapter 8 (pp. 239- 250).

- **Hyperspectral remote sensing:** Introduction, multispectral and hyperspectral imagery, subpixel analysis (SMA), applications of hyperspectral imagery

Reference: Farsi- Hyperspectral remote sensing, Jafari, R., 2010. Iranian Student Book Agency, Tehran-chapter 6.

- **Dust effects and consequents:** Introduction, dust studies in Iran, dust mapping techniques

Reference: Desert Dust in the Global System, Goudie and Middleton, 2006. Springer, Germany-chapter 3.

- **Spectral diversity:** Landscape heterogeneity, spectral heterogeneity, MSDI technique, application of MSDI in Australia's rangelands

Reference: An image-based diversity index for assessing land degradation in an arid environment in South Australia, Jafari et al., 2008. Journal of Arid Environments, 72, pp.1282–1293.

➤ Lecture 2

- **Rangeland monitoring:** Introduction to monitoring, Australia's monitoring programs, rangeland monitoring and assessment with remote sensing methods (examples of Australia's rangelands)

Reference: Rangeland monitoring using remote sensing, Booth and Wyoming, 2003. Arid Land Research and Management, 17, pp. 455–467.

➤ Lecture 3

- **Phenology:** Introduction to thermal remote sensing, introduction to phenology, Growing Degree Day (GDD) index, Spatial mapping of GDD with MODIS, LST retrieval from remote sensing data

Reference: Spatial mapping of growing degree days: an application of MODIS-based surface temperatures and enhanced vegetation index, Quazi et al., 2007. Journal of Applied Remote Sensing, 1, 013511.

➤ Lecture 4

- **Landscape ecology:** Introduction to landscape ecology, functional and dysfunctional landscapes, calculation of landscape function, indicators of landscape resource retention, applications of Landscape Function Analysis (LFA)

Reference: A new landscape leakiness index based on remotely sensed ground-cover data, Ludwig et al., 2007. Ecological Indicators, 6, pp. 327–336.

➤ Practical 1

- Extraction of the PD54 values in Erdas Imagine and ArcMap, Calculation of LFA using the CDLI index (Cover-based, Directional Leakiness Index)