

بنام خدا

« فرم طرح درس »

دانشگده: منابع طبیعی و محیط زیست رشته: - گرایش: - مقطع: کارشناسی ارشد
 نام درس: Digital Image Processing تعداد واحد نظری: - تعداد واحد عملی: - عنوان درس پیشنهادی:
 نام مدرس: دکتر سعید بهزادی تمام وقت ■ نیمه وقت □ مدعو □ محل برگزاری: کلاس □ آزمایشگاه □

هدف کلی درس :

رئوس مطالب	
Review of Electromagnetic Radiation Theory and Spectral Signatures <ul style="list-style-type: none"> The basic components of remote sensing systems Sources of electromagnetic radiation Electromagnetic radiation and its properties Interactions with the Earth's atmosphere Interaction with Earth surface materials 	Session 1
Introduction to Digital Imagery <ul style="list-style-type: none"> Characteristics of Digital Images such as digital imagery, Image space, and Feature space Different types of images Switching between formats Basic definition of Digital Image Processing such as Thresholding, Pixel Window, Pixel neighborhood, Image Histogram, Cumulative histogram, and so on. Quality of a Digital Image (Spatial resolution and Radiometric resolution) Image Formats (Band Sequential, Pixel Interleaved, Line Interleaved) 	Session 2
Pre-processing of remotely-sensed data (Geometric Image Correction) <ul style="list-style-type: none"> Source of Errors (Systematic Errors and Non-systematic Errors) Geometric correction, and registration Image Resampling 	Session 3
Pre-processing of remotely-sensed data (Radiometric and Atmospheric Correction) <ul style="list-style-type: none"> Radiometric corrections (Line drop out and Line banding) Atmospheric Corrections (Image-based methods, radiative transfer model, Empirical line method) 	Session 4
Image Enhancement - Concept of color <ul style="list-style-type: none"> Fundamental concept of color Color Space (RGB (red, green, blue), CMY (cyan, magenta, yellow), CMYK (cyan, magenta, yellow, black), IHS (intensity, hue, saturation)) Color Distance Color composite (true color and false color) Optimum Index factor (OIF) 	Session 5
Image Enhancement - Concept of color <ul style="list-style-type: none"> Transformation among different color space Transformation from RGB scheme into IHS scheme, RGB to CMY, etc. Image enhancement through IHS transformation Advantages of IHS transfer in image enhancement Synergic images 	Session 6
Image Enhancement - Contrast stretching <ul style="list-style-type: none"> Contrast stretching (Linear Contrast Stretching, and Non-linear Contrast Stretching) concept of Look-up Table 	Session 7
Image Enhancement - Filtering and edge enhancement <ul style="list-style-type: none"> Introduction Spatial domain low-pass (smoothing) filters such as Moving average filter, Median filter, and Adaptive filters 	Session 8
Image Enhancement - Filtering and edge enhancement <ul style="list-style-type: none"> Spatial domain high-pass (sharpening) filters such as: Image subtraction method and Derivative-based methods 	Session 9

<ul style="list-style-type: none"> • Spatial domain edge detectors • Frequency domain filters 	
Image Enhancement - Density slicing, thresholding <ul style="list-style-type: none"> • Density slicing • Thresholding 	Session 10
Image classification - Introduction <ul style="list-style-type: none"> • Classification Methods (Parametric methods, Nonparametric methods, and Non-metric methods) • Geometrical basis of classification 	Session 11
Image classification - Supervised <ul style="list-style-type: none"> • Training samples • Statistical classifiers • Neural classifiers 	Session 12
Image classification - Unsupervised <ul style="list-style-type: none"> • The k-means algorithm • ISODATA • modified k-means algorithm 	Session 13
Classification Accuracy Assessment <ul style="list-style-type: none"> • Thematic Map Accuracy • Classification Accuracy Assessment • Producer's Accuracy • Consumer's (User's) Accuracy • Kappa Coefficient • Conditional Khat 	Session 14
Image Transformation <ul style="list-style-type: none"> • Arithmetic Operations (Image Addition, Image Subtraction Image Multiplication, and Image division) • Image Ratio and Vegetation Indices • Normalized Difference Vegetation Index (NDVI) • Transformed Vegetation Index (TVI) • Soil Adjusted Vegetation Index (SAVI) • Tasseled Cap Transformation 	Session 15
Image processing using MATLAB <ul style="list-style-type: none"> • Images in MATLAB • Pixel Coordinates • Read and Display an Image • Converting Image Storage Classes • Converting Graphics File Formats • Image Arithmetic • Special Display Techniques • Image Analysis such as Image Contours, Edge Detection, Filtering, noise reduction, Image Enhancement, etc. • Image Type Conversion 	Session 16

توجه: در صورت تغییر مباحث و نحوه تدریس درس در هر نیمسال لازم است فرم مربوطه مجددا توسط اسناد محترم تکمیل و جهت به روز رسانی در اختیار آموزش دانشکده و سایت واحد قرار گیرد.

نحوه ارزشیابی فعالیت دانشجویی در طی دوره:

منبع مطالعاتی: