

## Review List for Midterm Examination

**Note:** The major materials for review include the textbook and my lecture notes. The lecture notes highlight what we have learned in the past lectures and labs, while the textbook will help you fill in the details. Searching through the Internet (using [www.google.com](http://www.google.com)) may also help you clarify any confusion from the lecture notes and/or the textbook. Your conceptual understanding is emphasized in the exam. So if you have any question during your review process, please do not hesitate to ask your instructor.

### Definitions and Discussion:

#### *Chapter 1*

*In situ* data collection  
 Errors introduced to *in situ* data  
 Remote Sensing (RS)  
 Advantages and limitations of RS  
 Steps of the Remote Sensing Process  
 The characteristics of the three types of logic  
 Biophysical and hybrid variables  
 The four sensor resolutions  
     Radiometric Resolution  
     Spatial Resolution  
     Spectral Resolution  
     Temporal Resolution  
 Full Width at Half Maximum (FWHM)

#### *Chapter 2*

The three energy transfer methods  
 Energy path from the Sun to a remote sensor  
 Electromagnetic Radiation  
 Wave Theory  
 Particle Theory  
 Frequency  
 Wavelength  
 Micrometer and nanometer  
 Blackbody  
 Stefan-Boltzmann Law  
 Wien's Displacement Law  
 Refraction  
 Scattering (Three types)  
 Absorption  
     Water absorption bands  
     Atmospheric windows  
 Reflection  
     Specular reflector and diffuse reflector  
 Transmission

Simple radiation budget equation  
 Spectral reflectance curves  
 Spectral Radiance  
 Irradiance  
 Radiant Flux  
 Radiant flux density  
 Radiant Exitance (Radiance)  
 Path Radiance

#### *Chapter 4*

Significance of aerial photography  
 Vantage point  
     Oblique aerial photo  
     Vertical aerial photo  
 Single Lens camera  
 Multilens camera  
 Image motion compensation  
 Intervalometer  
 The nine annotation marks on aerial photos  
 Focal plane and focal length  
 f/stop and shutter speed  
 Additive color theory  
 Subtractive color theory  
 Primary colors and complementary colors  
 Absorption and polarizing filters  
 Radiometric characteristics of Film  
     Transmittance  
     Opacity  
     Density  
     Characteristic Curve  
 Color Infrared Photography  
 Electronic Imaging  
 Charge-Coupled Devices (CCDs)  
 Photography versus Electronic Imaging

*Chapter 5*

The 4 major reasons for image interpretation  
The 16 elements of image interpretation  
Pseudoscopic illusion  
Convergence of evidence  
The multi-concept approach

*Chapter 6*

Photogrammetry  
The 8 major measurements  
Flightline  
Exposure Stations  
Fiducial Marks  
Endlap and Sidelap  
Block of aerial photography  
Uncontrolled photomosaic  
Principal Point (also Conjugate P.P.)  
Metric measurement with single photo  
Photograph scales  
Relief displacement (R.D.)  
Height measurement with R.D.  
Height measurement based on shadows  
Stereoscopic parallax  
The parallax equation  
Differential parallax  
Parallax measurement  
Air base  
Base/height ratio  
X, Y, Z measurement based on parallax  
Ground control (horizontal & vertical)  
Relative and absolute orientation  
Orthophotography  
Differential Rectification

Digital Elevation Model (DEM)

*Chapter 7*

Multispectral remote sensing  
Hyperspectral remote sensing  
Analog-to-digital conversion  
Information flow in space-borne RS  
Digital image configuration  
Imaging using discrete detectors and scanner  
Imaging using linear arrays  
Landsat Program Characteristics  
    Multi-Spectral Scanner (MSS)  
    TM (and its improvement over MSS)  
        Application of the 2 mid-IR bands  
    ETM+ (and its improvement over TM)  
        The four resolutions of different sensors  
Sun-Synchronous Orbit  
Orbital inclination angle  
Local Sun Time  
World Reference System (WRS)  
SPOT Program Characteristics  
Side-to-Side Off-Nadir Viewing  
Pointability  
SPOT Stereoscopic Imaging  
Comparison of SPOT HRV and TM  
NOAA Satellites and AVHRR Imagery  
AVHRR Spectral Channels  
AVHRR LAC and GAC Resolutions  
Normalized Difference Vegetation Index  
GOES Satellites and their Characteristics  
AVIRIS characteristics  
Earth Observing System (EOS)  
    MODIS and ASTER

**Equations:**

Everything you have seen to this point is fair game. I do not expect you to have them memorized, but if I were to put them on the test I would expect you to know what they are and what they mean in terms of usage.