Authoring Organization: Del Mar College
Written by: Nate Jennings

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Course Alignment Matrix

Originating College: American River College

Course Title: GST 105: Introduction to Remote Sensing

Course Number: GST 105

Recommended Text/Materials:

Title Remote Sensing and Image Interpretation
Author Lillesand, Kiefer, and Chipman, 2007
Editions 6th, Wiley & Sons
ISBN: 0470052457 and ISBN-13: 978-0470052457

Competencies (these can be from the institution, national standards, industry standards, etc.)	Lesson(s)/Modules presented & assessed	Resources & Development Ideas (Optional - this column is helpful when the document is used as a course design worksheet for new development)
1. Describe basic physics concepts on which remote sensing is based (i.e. Electromagnetic Spectrum, etc.)	2	
2. Select appropriate data set for remote sensing application based on spectral, temporal, radiometric and spatial resolution.	3,4,5,7	
3. Describe characteristics of passive and active remote sensing systems (such as multispectral, LiDAR and Radar).	2, 3, 4, 5	
4. Describe the fundamentals of Photogrammetry	4	
5. Perform basic remote sensing workflows to solve problems (such as acquiring data, feature extraction, change detection, pre- and post-processing, create	3,4,5,6,7	

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composite images and image classification).		
6. Describe future trends in remote sensing	1	
7. Apply basic concepts, methods and uses of accuracy assessment and ground truthing to the results of remote sensing workflows.	6	
8. Interpret, analyze and summarize results of a remote sensing workflow.	3,4,5,6,7	

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Lesson/ Module	Readings & Topics	Lesson Objectives	Assessment & Points
1	**Topic:** What is Remote Sensing	• Define remote sensing. • List different types of remotely sensed data and sensor systems. • Describe different types of remote sensing systems and their applications. • Describe the history and future trend applications of remote sensing. (SLO 1,3,6)	50 pts - Application Papers 20 pts - Quiz
2	**Topic:** Physical Foundations	• Describe the basic physical concepts on which remote sensing is based such as the electromagnetic spectrum, reflection and absorption. • Explain the physical differences between active and passive remote sensing systems. (SLO 1, 3)	20 pts – Quiz
3	**Topic:** Sensor Platforms, Image Processing Basics,	• Describe the primary components of a digital	20 pts – Quiz

	Band Ratios, and Transformations	image • Describe characteristics of passive and active remote sensing systems. • Explain common processing functions found within geospatial software: image composites, subsets, mosaics, and band ratios including NDVI and Tasseled Cap Transformation. • Create an image composite, image mosaic, and image subsets using ArcGIS. • Analyze results of work sensing workflow for image composites. (SLO 3,5,8)	15 pts – Lab Image Composition, Mosaic, Subset 100 pts - Exam 1
4	**Topic:** Elements of Photogrammetry	• Define photogrammetry. • Explain fundamental concepts of photogrammetry. • Explain the common photogrammetric process steps. • Perform an image rectification. • Describe the components of an ortho image/photo.	20 pts – Quiz 15 pts – Lab Image Rectification
5	**Topic:** Remote Sensing and Image Classification	• Define image classification. • Explain supervised, object-based image classification techniques.	20 pts – Quiz 15 pts – Lab Unsupervised Classification

		• Perform image classification techniques such as supervised and unsupervised classification on remotely sensed data. (SLO 2, 5,7, 8)	15 pts – Lab Unsupervised Classification
6	**Topic:** Accuracy Assessment	• Explain the importance of accuracy assessments and why they are used for image classification project(s). • Describe the computed measures of a typical accuracy assessment. • Perform an accuracy assessment on the products of remote sensing workflows. • Incorporate accuracy assessment results into interpretation and analysis of workflow outputs. (SLO 5, 7, 8)	20 pts – Quiz 10 pts – Lab Accuracy Assessment
7	**Topic:** Final Project	• Create and implement one or more image processing protocols through an independent project. • Explain the results including the discussion of problems and potential resolutions. • Create presentation to discuss completed image processing project.	375 – Final Project 100 pts – Exam 2

		(SLO 2, 5, 7, 8)	

Grade/Points

To calculate the points and grading scale, double click on the worksheet below. Modify the Assessment titles, the Number of assessments and the Points per assessment. Total points and the grading scale will be calculated automatically.

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Assessment	Number	Points per	Total points
Application Papers	1	50	50
Labs	5	15	75
Quizzes	6	20	120
Independent Project	1	375	375
Examinations	2	100	200
		Course points	820
	Grading Scale		
90%	A	738	820
80%	B	656	737
70%	C	574	655
60%	D	492	573
	F	0	491

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