



**AYDIN ADNAN MENDERES UNIVERSITY**  
**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**  
**LANDSCAPE ARCHITECTURE**  
**LANDSCAPE ARCHITECTURE**  
**LANDSCAPE ARCHITECTURE MASTER**  
**COURSE INFORMATION FORM**

Course Title	Time Series Analysis and Change Detection Using Remote Sensing								
Course Code	ZPM534	Course Level			Second Cycle (Master's Degree)				
ECTS Credit	8	Workload	200 (Hours)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	Aims to present information about visual analysis methods by using the changes in the landscape image algebra, conversion, classification, GIS by using various algorithms, methods and approaches in terms of their use, advantages and disadvantages, and the need for landscape management								
Course Content	Pre-processing requirements for different change detection techniques. Introduction to digital image processing for change detection. Image algebra methods, Classification method: post-classification comparison, spectral and temporal mixture analysis, expectation maximization, unsupervised classification. Advantage and disadvantage of change detection procedure for a specific problem.								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Case Study, Project Based Study, Individual Study, Problem Solving								
Name of Lecturer(s)									

#### Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	40
Final Examination	1	60

#### Recommended or Required Reading

1	Alphan, H., (2004) " Kıyı Alanları Yönetiminde Uzaktan Algılama Yöntemleri ile İzleme Programı." Çukurova Üniversitesi Fen Bilimleri Enstitüsü Peyzaj Mimarlığı Anabilim Dalı, Doktora Tezi , Adana.
2	Campbell, J.B., 1996, Introduction to Remote Sensing, 2nd Edition, Guilford Press, Newyork.
3	CCRS, 1998, Canada Center of Remote Sensing. Fundamentals of Remote Sensing. <a href="http://www.ccrs.nrcan.gc.ca">http://www.ccrs.nrcan.gc.ca</a>
4	Collins, J. B. and Woodcock, C. E., 1996, An assessment of several linear change detection techniques for mapping forest mortality using multitemporal Landsat TM data. Remote Sensing of Environment, 56, 66–77.
5	Jensen, J.R., 1996, Introductory Digital Image Processing: A Remote Sensing Perspective(2 nd edition), Prentice-Hall, Inc., Upper Sandle River, NJ.
6	Lu, D., Mausel, P., Brondizio, E., Moran, E., 2003, Change Detection Techniques, International Journal of Remote Sensing, Vol. 25, No. 12, 2365- 407.
7	Mitri, G. H., Gitas, I. Z., 2004, "A performance evaluation of a burned area object-based classification model when applied to topographically and non-topographically corrected TM imagery", International Journal of Remote Sensing, Vol. 27, No. 1, 4154.

Week	Weekly Detailed Course Contents	
1	Theoretical	Introduction to course: content, reason, importance, process method and needs.
2	Theoretical	Information about satellite images
3	Theoretical	Pre-processing techniques for change detection
4	Theoretical	Image differencing, image ratioing, image regression, and change vector analysis
5	Theoretical	Binary change detection and labeling change detection
6	Theoretical	Change detection using vegetation indices such as NDVI, SAVI, MSAVI
7	Theoretical	Transforming bi-temporal and multitemporal data
8	Intermediate Exam	Mid-term exam
9	Theoretical	Classification method: piksel based unsupervised classification, post-classification comparison
10	Theoretical	Classification method: piksel based supervised classification, post-classification comparison
11	Theoretical	Classification method: object based unsupervised classification, post-classification comparison
12	Theoretical	Classification method: object based supervised classification, post-classification comparison
13	Theoretical	Advantage and disadvantage of different change detection techniquis
14	Theoretical	Project presentations
15	Theoretical	Project presentations
16	Final Exam	Final exam



**Workload Calculation**

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	8	3	154
Midterm Examination	1	20	1	21
Final Examination	1	24	1	25
Total Workload (Hours)				200
[Total Workload (Hours) / 25*] = <b>ECTS</b>				8

\*25 hour workload is accepted as 1 ECTS

**Learning Outcomes**

1	Understands change detection based on digital image processing on the basic level
2	Decides the correct procedures about image processing prior to operations when necessary
3	Learns change detection methods based on digital image processing
4	Decides appropriate analysis approaches to produce digital data which is required to deal with the problem
5	Expresses change information through maps and statistics

**Programme Outcomes (Landscape Architecture Master)**

1	e
2	e
3	e
4	e
5	e

**Contribution of Learning Outcomes to Programme Outcomes** 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5
P1	3	3	3	3	3
P2	5	5	5	5	5
P3	5	5	5	5	5
P4	5	5	5	5	5
P5	5	1	1	1	1

