

# SULTAN QABOOS UNIVERSITY COURSE OUTLINE

### PROGRAM:Soil Sciences

1.	Course Code	SWAE 4001				
2.	Course Title	Remote Sensing of the Environment				
3.	Credits	3 CR, 12 CP, 6 ECTS				
4.	Pre-requisite Course (s)	SWAE 3001				
5.	Co-requisite Course (s)	NA				
6.	Equivalent Course (s)	NA				
7.	Course Category	University Requirement	Un	iversity Elective		
	(Specify either as Elective or Requirement and	College Requirement	Co	llege Elective		
	appropriate level:	Department Requirement	De	partment Elective		
	<i>College, Department, etc.)</i>	Other (specify):				
8.	Course Owner	College: CAMS	Depart	tment:SWAE		
9.	Course Type	Lecture/Lab				
10.	Language of Instruction	English				

#### 11. Course Description

This course introduces the students to theoretical and practical foundations of remote sensing and its applications to environmental problems. A range of RS activities will be covered, e.g. sensors used, properties of the data, spectral reflectance and emittance of objects on the earth's surface, spectral signatures, image radiometric calibration, image geometric calibration, image processing of multi and hyper spectral images, supervised and unsupervised classification, and accuracy assessment techniques.

#### 12. Teaching/Learning Strategies

Apart from normal lectures, short videos and practical sessions are also part of this course. Students will have to do case studies based on what they learn in lectures and in the practical sessions. There will be homework, 2 tests, 1 comprehensive final and lab/case study reports to assess student achievements.

13. Evaluation Methods					
2 Tests	30%				
Final	45%				
Homework	5%				
Lab reports and Project	20%				
Total:	100%				

## 14. Required Course Core Material

1) Remote Sensing and image Interpretation, Thomas Lillesand, Ralph W. Kiefer, and Jonathan Chipman, Wiley and Sons, 7th edition, 2015.

2) Hyperspectral Remote Sensing; Principles and Applications. William S., Hungate, Russell Watkins, and Marcus Borengasser. CRC, 2007.

**15.** Matching Course Objectives with the Program Outcomes and with SQU Graduate Attributes \* <u>Click here</u> to view a list of action verbs use in developing objectives

SQ	U Graduate Attributes				
<b>A.</b>	<b>SQU graduates should be able to:</b> apply the knowledge and skills	<b>B.</b> 1.	SQU graduates possess interpersonal communication skills and	C.	SQU graduates should
2.	relevant to the specialization communicate effectively and use		alignment with culture of international labour market to assist them in practical		<b>relish</b> good citizenship qualities, conscious of
2.	information and communication technologies	2.	life and in living successfully skills and motivation for independent		their national identity and socially responsible, engage in community
3.	critically analyze complex information and present it in simple		learning and engagement in lifelong learning and research		affairs and mindful of contemporary issues.
	legible manner	3.	work ethics and positive values, and enjoy intellectual independence and autonomy		
		4.	teamwork skills and display potential leadership qualities		

#	Course Learning Objective	Relevant Program Outcome(s)	Applicable Attribute(s)
1.	Introduce the fundamental principles of remote sensing	Comprehend the fundamental principles of remote sensing	
2.	Introduce earth resource satellites and sensors	Comprehend the fundamental principles of remote sensing	
3.	Introduce the techniques of digital image analysis	Conduct analyses of digital satellite images in appropriate manner	
4.	Explore the various applications of remote sensing in environmental studies	Link remote sensing applications and concepts to practical environmental problems Carry out remote sensing project based on environmental research and studies	
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16. Student Responsibilities

It is the student's responsibility to know and comply with all University Academic Regulations relevant to participation in this course. These regulations specifically include the Attendance and Student Academic Misconduct policies.

For attendance, it is the student's responsibility to be punctual and to attend all classes.

Students are expected to perform their work with honesty and avoid any academic misconduct, which is defined as the use of any dishonest or deceitful means to gain some academic advantage or benefit. This can take many forms, including but not limited to, the following: copying, plagiarism, collusion and forging documents. For full details please refer to the Undergraduate Academic Regulations and to the Student Academic Misconduct Policy.

Additionally, this course requires that you:

Course CoteSWAE 4001Course TitleRemote Sensing of the EnvironmentYear/SemesterFall 2017Section10/11Day, Time, and PlaceCourse CoordinatorMalik Al-WardyOffice Location243Office HoursBy AppointmentOffice Location243Office HoursBy AppointmentOffice Ext.1224Emailmwardy@squ.edu.omTentative ScheduleWeekLecture/TopicMaterial to be CoveredAssignment /ExamViewekLecture/TopicMaterial to be CoveredAssignment /Exam(%)1SensingE-book 1/Section 1 HandoutsLab 112Earth resource satellites, sensors, and dataE-book 1/Section 5 HandoutsLab 3 HW113Interpretation of satellite imagesE-book 1/Section 7 HandoutsLab 4 HW114Image display, enhancement and interpretationE-book 1/Section 7 HandoutsLab 5 Hook 2/Section 7 Handouts16Radiometric correctionsE-book 1/Section 7 HandoutsLab 6 HW217Exam 1Interpretation158Geometric transformationsE-book 1/Section 7 HandoutsLab 7 Handouts19Supervised and Unsupervised classificationE-book 1/Section 7 HandoutsLab 9 Handouts110Supervised and Unsupervised classificationE-book 1/Section 7 HandoutsLab 9 Handouts111Accuracy assessment<		COURSE INFORMATION						
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	APPENDIX	A: INSTRUCT	ORS OF MULIPL	E SECTIONS	
Section	Instructor	Day, Time, and Location	Office Location and Extension	Email	Office Hours

Additional E-books available:

- 1. Hyperspectral remote sensing of vegetation
- 2. Remote sensing of land use and land cover
- 3. Remote sensing of drought
- 4. Remote sensing of natural resources
- 5. Remote sensing for water resources, disasters, and urban studies
- 6. Classification methods of remotly sensed data