ORIGINAL

The University Of Toledo

NEW COURSE PROPOSAL

Level (check one)

Undergraduate

(•) Graduate

Will this course impact program requirements? If yes, a Program Modification must be completed.

Type of course (check all that apply):

Academic Skills Enhancement Writing Intensive (WAC) honors

Univ. Core: *English* *Hum* *Math* *Nat.Sciences* *Social Sciences*

Multicultural: *Diversity of US Culture* *Non-US Culture*

Transfer module: *Arts&Hum* *Engl* *Math* *Nat Sci & Phys* *Soc Sci*

(to be considered as core curriculum, question 18 must be completed)

1. College: ARS

   Department: EEES

2. Contact Person: Richard Becker Phone: 530-4571 Email: richard.becker@utoledo.edu

3. Alpha/Numeric Code (Subject area - number): EEES - 5490

4. Proposed title:

   REMOTE SENSING OF THE ENVIRONMENT

   Proposed effective term: FALL 2010

5. Planned enrollment per section: 20 per term: 20

6. Is the course cross-listed with another academic unit? ☑ Yes No

   Is the course offered at more than one level? ☑ Yes No

   If yes to either question, please list additional Alpha/Numberic codes, and submit a separate New Course form or Course Modification form for the course(s) referenced below.

   a. EEES - 4490 b. GEPL - 4490 c. GEPL - 5490

   Approval of other academic unit (signature)

   Name and title Dr. Peter Lindquist, Prof. and Chair, GEPL

   If course is to be offered at more than one level, attatch an explanation of the different requirements that students must meet for each level. If the requirements are the same for each level, justification must be provided.

Administrative Use Only

Code:

Approved (senate or Grad Council)

Effective Date: / / (mm/dd/yyyy)

CIP Code:

Sub: **Prog:** **Level:**

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COLLEGE OF GRADUATE STUDIES

7. Credit hours: Fixed: 4 or Variable: to

8. Delivery Mode:

	Primary	Secondary	Tertiary
a. Activity Type*	Lecture		
b. Minimum Credit Hours	4		
Maximum Credit Hours	4		
c. Weekly Contact Hours	4		

*Choices are: Lecture, Recitation, Seminar, Regular Lab, Open Lab, Studio, Clinic, Field, Independent Study, Workshop, Computer Assisted Instruction, Other

9.

Terms offered: ☑ Fall ☐ Spring Summer

Years offered: ⦿ Every Year Alternate Years

10.

Are students permitted to register for more than one section during a term? ⦿ No Yes

May the courses be repeated for credit? ⦿ No Yes [ ] Maximum Hours

11.

Grading System:

Undergraduate	Gradute
Normal Grading (A-F,PS/NC.PR, I)	⦿ Normal Grading (A-F,PS/NC.PR, I)
Passing Grade/No Credit (A-C, NC)	Grade Only (A-F)
Credit/No Credit	Satisfactory/Unsatisfactory (G only)
Grade Only (A-F, PR, I)	Audit only
Audit only	No Grade
No Grade	

12. Prerequisites (must be taken **before**): a. GEPL - 3550 b. EEES - 2100 c. [ ] - [ ]

⦿ PIN (Permisson From Instructor) PDP (Permission From Department)

Co-requisites (must be taken **together**): a. [ ] - [ ] b. [ ] - [ ] c. [ ] - [ ]

13.

If course is to replace an existing course(s) will be deleted, and when should that deletion occur?

	Course to be removed from inventory	Final Term to be offered (YYYYT. i.e. use 20064 for Fall'06)
a.	[ ] - [ ]	[ ]
b.	[ ] - [ ]	[ ]
c.	[ ] - [ ]	[ ]
d.	[ ] - [ ]	[ ]

14.

Catalog description **(30 words Maximum)**

Introduction to theory, methods and techniques used to gather and analyze remote sensor data. Topics range from low altitude air photo interpretation through satellite image acquisition.

15.

Attach a copy of a complete outline of the major topics covered. (Providing a syllabus that includes this information is acceptable.)

Syllabus: Click here to view the Syllabus
Attachment 1 Click here to view the Attachment
Attachment 2 No Attachment

16.

Where does this course fit in the University/College/Department curriculum? (Be specific by course level, if applicable). Indicate prospective demand.

This course will serve as an elective for the MS geology and MS Biology (Ecology) degrees. Remote sensing is becoming a commonplace tool in all of these fields. This course will provide the students with the theoretical basis and some practical applications of remote sensing to their chosen field.

17.

If the proposed course is similar to another course in the College or University, please describe the difference and provide a rationale for the

duplication. (If this course duplicates material covered in another course within your department or college or in another college, attach a letter of endorsement from that area's dean and department chairperson indicating their support. Clarify the maner in which this course will differ).

This course overlaps in content with GEPL 4490/5490. Remote sensing is an interdisciplinary field that is used in the Geological, Ecological and Environmental science fields, as well as in Geography and Planning. After discussions between Dr. Czakowski in GEPLand Dr. Becker in DES, minor modifications were made such that the courses are perfectly compatible so that they can be cross listed and taught by either instructor. This provides a significant advantage, as it will combine two smaller classes into a single class, which will be offered every year. The course will provide an integrative opportunity for students in multiple programs, allowing both graduates and undergraduate students an interdisciplinary perspective on their coursework, while conserving faculty resources. The course will be individually taught, alternating years between faculty from GEPL and DES.

18. If the course is intended to meet a University Undergraduate **Core** requirement, complete the following and submit a course syllabus using the *template*:

Please explain how this course fulfills the general education guidelines. (*Guidelines* are available in *Faculty Senate Website*)

NA
Note on #12: Prerequisites should read: GEPL course OR EEES course OR permission of Instructor

Course Approval:

Department Curriculum Authority:	Thom B Baker	Date / /	(mm/dd/yyyy)
Department Chairperson:	[signature]	Date 4 / 14 / 2010	(mm/dd/yyyy)
College Curriculum Authority:	David Black David Black	Date 3/8 / 3/28 / 2010	(mm/dd/yyyy)
College Dean:	Christine A. Habrecht Christine A. Habrecht 5/28/10	Date 4 / 1 / 2010	(mm/dd/yyyy)

After college approval, submit the original signed form to the Faculty Senate (UH 3320) for undergraduate-level courses; for graduate-level courses submit the original signed form to the Graduate School (UH3240). For undergraduate/graduate dual-level courses, submit the proposals to each office.

Faculty Senate Undergrad. Curriculum Comm.:		Date / /	(mm/dd/yyyy)
Faculty Senate Core Curriculum Comm :		Date / /	(mm/dd/yyyy)
Graduate Council :		Date / /	(mm/dd/yyyy)
Office of the Provost :		Date / /	(mm/dd/yyyy)
Registrar's Office:		Date / /	(mm/dd/yyyy)

EEES 4490/5590 Course Proposal.

Explanation as specified in Item #6

The course will be offered at both the 4000 and 5000 level. Students taking the course at the 4000 level will have approximately 6-8 computer based practical exercises and 2 exams. Students taking the course at the 5000 level will be expected to complete all of the requirements of the 4000 level course, plus the completion of either a directed project or paper, with an in class presentation.

Tentative Syllabus

EEES 4490/5490 Remote Sensing of the Environment

Fall 2010

Instructor: Richard Becker

Office: BO 3026

Lab: BO 3018

Email: richard.becker@utoledo.edu

Office Hours TBD – 5 hours

Course Overview: This course will acquaint students with the fundamentals of the remote sensing process. Students will become acquainted with a variety of airborne and satellite sensor platforms which collect data in the visible, near infrared, thermal and microwave portions of the electromagnetic spectrum. By the end of the course the students should understand the fundamental methods behind the different sensing techniques, and know which techniques are best used to answer a wide variety of scientific questions.

Students will be able to demonstrate their understanding of the material through practical assignments and homework as well as exams.

This course will is offered at both the 4000 and 5000 level. Students taking the course at the 4000 level will have approximately 6-8 computer based practical exercises and 2 exams. Students taking the course at the 5000 level will be expected to complete all of the requirements of the 4000 level course, plus the completion of either a directed project or paper, with an in class presentation.

Text: (Required) John R. Jensen, Remote Sensing of the Environment: An Earth Resource Perspective, Prentice Hall, ISBN 0-13-188950-8.

Annoucements and additional reading materials will be made through Blackboard.

Please check Frequently

Grading:

4000 level:
Practical exercises (6-8): 60%
Exams (2): 40%

5000 level:
Practical exercises (6-8): 48%
Exams (2): 32%
Project and presentation: 20 % (15% project+5% presentation)

Topics covered:

Introduction to Remote Sensing
The remote sensing process
Electromagnetic Radiation Principles
Visible/near infrared radiation, Thermal infrared radiation, microwave radiation
Elements of Photographic Systems
History; film characteristics; camera systems, Air Photo Interpretation
Photogrammetry
Characteristics of vertical photos; determining scale; measuring distances and heights of objects. Stereoscopic viewing-equipment; image parallax; measurements using stereopair photographs.
Introduction to Electronic Sensors
Concept of spectral signatures; field radiometry; electronic scanning systems.
Introduction to Optical Satellite Systems
Landsat/SPOT; Meteorological; Ocean, NASA, ESA, Private
Microwave Remote Sensing
Sensing process; interpretation of data; sensing systems- applications
SAR, Passive systemsn, Interferometry (optional)
Thermal Infrared Remote Sensing
Thermal signal sources and sensors; calibration issues; interpretation of data; applications.
Remote Sensing of Vegetation
Spectral Vegetation Indices.
Aquatic Remote Sensing
Aquatic Optics
Remote Sensing identification of Lithology, Soils
Urban Remote Sensing
Land Use/Land Cover Classification
Digital Image Processing
Data Merging and scaling issues.

If you are not familiar with the University's standards for Academic Dishonesty (cheating, plagiarizing, etc.) and possible sanctions (ranging from verbal reprimand to expulsion), please review them in the university catalog at:http://www.utoledo.edu/catalog/2008catalog/general_2008.html

If you have a disability which may require a classroom accommodation, you need to register with the Office of Accessibility, Room 1400 Snyder Memorial (Voice 419.530.4981, TTY 419.530.2612), if you have not already done so. Information shared with the Office of Accessibility will be kept confidential to the extent consistent with State and Federal law

Tentative Schedule:

Date	Topic	Readings	Assignment Due	Other
Aug 23	Introduction	Ch 1		
Aug 25	EM Principals	Ch 2		
Aug 30				
Sept 1	Photographic Systems	Ch 3+4	Exercise #1 – Introduction to Erdas	
Sept 6	No Classes		Labor Day	Sept 7: Last day to Drop/Add
Sept 8	Photogrammetry	Ch 5 +6		
Sept 13				
Sept 15				Preliminary project identification due (1 paragraph)
Sept 20	Electronic Sensors	Ch 7	Exercise #2 – Air Photo Interpretation	
Sept 22	Optical Satellite Systems			
Sept 27				
Sept 29				
Oct 4	Thermal	Ch 8	Exercise #3 – Vis/IR	
Oct 6				Project Proposal Due
Oct 11	No Classes		Fall Break	
Oct 13	Exam 1			
Oct 18	Microwave Sensors	Ch 9		
Oct 20				
Oct 25		Massonnet Paper	Exercise #4 – Thermal images	
Oct 27	Vegetation	Ch 11		Oct 29: Withdrawal Deadline
Nov 1				Project methods draft Due
Nov 3	Aquatic	Ch 12		
Nov 8			Exercise #5 – Radar interpretation	
Nov 10		TBD Paper		
Nov 15	Soils, Lithology Identification	Ch 14		
Nov 17		Sultan et al. paper		
Nov 22			Exercise #6 –Aquatic Methodologies	
Nov 24	No Classes		Thanksgiving Break	
Nov 29	Land Use/Cover			Project results draft due
Dec 1				
Dec 6	Digital Processing issues			
Dec 8	Project Presentations		Exercise #7 Classification Techniques	Project report due
Final Exam				