

Perspective on Education in Photogrammetry and Remote Sensing

An introduction to courses, programs, and innovations in education on the North American continent.

THIS ISSUE of our Journal provides an updated overview of the widely dispersed and diversified programs which offer educational opportunities in the United States, Mexico, and Central America, and reflects the role and scope of photogrammetry and remote sensing. Few other fields of study are interrelated with such a diversified group of academic disciplines and departments or research institutions; and few other fields have contributed so actively to the instrumented discovery of both scientific realities and data for applied environmental management both on earth and in space.

The extensive collateral training activities carried on by governmental agencies and private enterprises actively involved in photogrammetry and remote sensing may be suggested by some of the data in the surveys reported here, but no attempt has been made to survey these very significant contributions to the advancement of photogrammetric skills. Nor can this group of presentations do other than illustrate, as one article demonstrates, the value of the short and "mini" courses, symposiums, and summer institutes—often supported by the National Science Foundation—that have been of outstanding value in expediting the transfer of knowledge and new technology and the potential of its application. These programs which often have been scheduled in association with the time and place of national meetings by various disciplines have been particularly successful in dispersing awareness of remote sensing capabilities. Some professional associations have established their own committees or commissions on

remote sensing to encourage communication, and some, such as the Association of American Geographers' Committee on Remote Sensing, have established periodical publications which vary from newsletter to pamphlet size and emphasize educational activities and methods. Two articles of this issue demonstrate the development of innovative instructional techniques, a frequent occurrence in remote sensing education and photogrammetry.

Since other authors in this issue have referenced previous articles in this Journal concerning education, they are not discussed here, but those interested in pursuing the historical perspective will note the great expansion of education related to the use of imagery. The advance of detecting and recording systems, the improvement in reproduction methods, and the advance of interpretation techniques and measurement methods have stimulated the growth in courses, programs, and career majors. However, growth in education has been so rapid that many significant dimensions are not yet well developed. The increasing importance of certification, as recognized by the Society, seems to suggest a greater attention to such tasks as defining the core requirements for a professional photogrammetrist and remote sensing practitioner. This also requires an improved structure of continuing education to maintain and update professional skills in a dynamic field. Many teachers of remote sensing are delighted with the recent publication of the *Manual of Remote Sensing*, but still regret the need for a text that organizes learning experiences for students entering the field. Specialized texts relating to particular disciplines are developing, but the cost of color printing often inhibits their ef-

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fectiveness when serving limited markets. Teaching aids which can introduce students to automatic measurement and interpretation systems are needed, because only a few students have access to the high-capability electronics of elaborate laboratories. Simplified interpretation systems which can relate to computer terminal access now found in almost all educational centers would advance educational development and could also encourage smaller agencies, such as county planning groups, to integrate imagery data in their information systems.

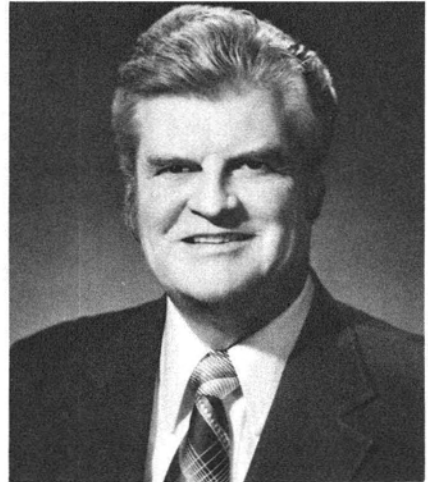
The Society is appreciative of the considerable service of L. David Nealey, who organized the most extensive survey of our educational programs yet achieved—and to Dario Rodriguez-Bejarano who has reported on Mexico and Central America. Much of the momentum for these studies was initiated by the Remote Sensing Division's Committee on Education, Chaired by Ralph W. Kiefer. We regret any omissions that may occur, and look forward to meeting the need for continuing reporting on education in photogrammetry and remote sensing.

ASP's 1977 President Cartwright

Vern Cartwright has been active in the field of photogrammetry and aerial photography for over 30 years and more recently has entered the fields of operational remote sensing and computer cartography. He is registered in the State of California as an Industrial Engineer, Professional Engineer, and as a Photogrammetric Surveyor. He was instrumental in obtaining recognition and licensing of photogrammetrists in California.

Vern is a Past President of the National Legislative Council for Photogrammetry, Past President of the Northern California Region American Society of Photogrammetry, and has served as the 1st and 2nd Vice President of the National Society. He served for two years on the Board of Directors of the Northern California Chapter of the American Congress of Surveying and Mapping, is a member of the American Public Works Association, the American Society of Military Engineers, Legislative Council of Photogrammetry, American Society of Civil Engineers, and Society of Photo-Optical Instrumentation Engineers. He has authored many articles on remote sensing, photogrammetry, and computer cartography and is a visiting lecturer on these subjects at a number of universities.

In 1967 Governor Ronald Reagan appointed him to the California State Board of Control on which he served for eight years as the Public Member. This Board administers a program to aid victims of violent crimes and holds hearings to decide all money claims against the State of California. Also in 1967, he was appointed by Governor Reagan to the Engineers Advisory Council to review and make recommendations on legislation pertaining to engineers. In 1968 he served on a Task Force Committee for Aerospace



Education under the direction of Congressman Donald Clausen.

He is the President and sole owner of four firms: Cartwright Aerial Surveys, Inc., Datamap Systems, Inc., Cartwright Blueprint Company, and Cartwright Research.

In 1966 he founded the International Remote Sensing Institute, a non-profit organization dedicated to the advancement of the science of remote sensing. During the past four years he has been active in the development of data handling systems and techniques.

Vern Cartwright was born in Medford, Oregon, attended schools at Medford and Portland, Oregon, and served in the navy as an aerial photographer for three years during World War II.

His hobbies are building computers and running political campaigns. He and his wife Miriam reside in Sacramento, California.

Remote Sensing/Photogrammetry Education in the United States and Canada †

A listing of courses, programs, projects, and textbooks.

INTRODUCTION

REMOTE SENSING/PHOTOGRAMMETRY is a critical tool in present-day research, one that can reduce field reconnaissance in a remote area of Alaska from a few months to a few days; tell a HUD planner where to site for greatest soil and rock competence; watch

related programs at 125 universities in the United States. In 1972, Eitel published a list of 80 remote sensing courses, and Bidwell (1975) and Morain (1975) recently researched colleges and universities for courses and programs in this field. The data presented here were obtained between May

ABSTRACT: Remote sensing and photogrammetry are an integral part of many programs at colleges and universities in the United States and Canada. In 1975, there were at least 470 courses in the United States and 64 in Canada that stressed remote sensing/photogrammetry. Thirty-eight universities in the United States and six in Canada have or plan to initiate majors, minors, or areas of specialization in remote sensing/photogrammetry. Many of the courses include field trips and several are offered in the evening. At least 63 books (listed) have been adopted as textbooks and reference books. The American Society for Engineering Education reported at least 110 basic engineering research projects underway at 31 member institutions in 1974 and 1975 (list included).

wheat in the United States, USSR, and the Peoples Republic of China; reveal the crop pattern of pre-historic Sinagua farming in Arizona; and make possible mapping for the search for life on Mars.

The status of remote sensing and photogrammetry in college and university curricula has been the subject of several works in the past few years. Stanton (1971) discussed photogrammetry and photogrammetry-

1975 and February 1976, mainly from responses of faculty members of colleges and universities to a questionnaire on courses and programs in remote sensing/photogrammetry sent to more than 1200 institutions in the United States and Canada. In the United States today, there are at least 187 courses in remote sensing¹, 74 in photointerpretation², 23 in photogeology, 8 in as-

† Revised from the paper presented at the 42nd Annual Meeting, American Society of Photogrammetry, Washington, D. C., February 22-28, 1976, to include information on courses and programs in Canada.

¹ Used in the general sense of the term, the courses cover the electromagnetic spectrum from the ultraviolet through the radio range and include non-photographic sensor systems.

² Courses mainly concerned with aerial photography and camera systems.

trogeology, 96 in photogrammetry, 18 in image processing, and 59 in other related subjects in the United States (List A). Of these, 23 are programmed for evening classes and 113 include trips. Courses are taught in 178 institutions in 24 academic areas.

Canadian programs in 1975 included at least 27 remote sensing courses, 10 photo-interpretation courses, 25 photogrammetry courses, and two other related courses (List B), taught at 13 institutions in seven academic areas. At least one of them is offered in the evening and 13 include trips.

About 75 percent of the remote sensing/photogrammetry courses in the United States are taught by departments of geography (22 percent), geology (19 percent), civil engineering (20 percent), and forestry (13 percent) (Table 1). Another four percent of the courses are in the curriculum of civil engineering departments if the Ohio State

University's Department of Geodetic Science can be included in the category of civil engineering. Approximately one-third of all remote sensing courses are taught by geography departments, and 72 percent of all photogrammetry courses are taught by civil engineering departments (Ohio State included). The majority of the image processing courses are taught in electrical engineering departments, which reflects the infancy of computer applications to remote sensing. In the future, image processing courses are expected to increase in number and to be introduced to applications-oriented departments, i.e., geology, forestry, and geography.

The number of students enrolled in remote sensing/photogrammetry courses could not be accurately determined from the information received in response to the questionnaire. Many responses were received that did not include enrollment figures, and

TABLE I. RELATION OF TYPES OF COURSES TO DEPARTMENTS IN WHICH THEY ARE OFFERED (U.S.).

		LEGEND									
		RS—Remote Sensing			MPI—Map & Photo-Interpretation						
		RSr—Remote Sensing related			PGe—Photogeology						
		PI—Photo-Interpretation			AG—Astrogeology						
		PIr—Photo-Interpretation related			SD—Systems Design						
		PG—Photogrammetry			IP—Image Processing						
		PGr—Photogrammetry related			OP—Optics						
DEPARTMENT											
	Geography	Geology	Forestry	Civil Engineering	Geodetic Science	Electrical Engineering	General Engineering	Other	Total	Percent	
TYPE COURSE											
RS	72	42	22	13	1	5	4	28	187	40	
RSr	1	1		2				5	9	2	
PI	17	7	25	19	2		1	3	74	16	
PIr	2	1		2					5	1	
PG	1	1	13	54	15		10	2	96	20	
PGr				5	1		1		7	1	
MPI	9	7	2					1	19	4	
PGe		23							23	5	
AG		8							8	2	
SD						10		4	14	83	
IP	1	1		1		8	1	6	18	4	
OP						4		6	10	2	
TOTAL	103	91	62	96	19	27	17	55	470		
PERCENT	22	19	13	20	4	6	4	12			

many of these were from large universities having fairly comprehensive programs in remote sensing and photogrammetry. A tally of the responses shows that at least 4000 students are enrolled annually in a remote sensing/photogrammetry course, but there is no way to determine from this information how many of them enroll in two or more such courses. It is thought that the number of students enrolled in remote sensing/photogrammetry courses annually is as high as 6000.

Trips taken as an integral part of at least 113 courses include visits to local aerial survey firms or government agencies. Field trips provide the students with practice in ground-truth verification, occasionally in actual data acquisition from remote-sensing platforms.

Thirty-eight universities in the United States (List C) and six in Canada (List D) have or plan to initiate majors, minors, or areas of specialization in remote sensing, photogrammetry, or astrogeology (planetary geology). Several universities that offer more than one course in remote sensing/photogrammetry do not provide degree programs in these areas. Colorado State University, for instance, has at least 13 undergraduate and graduate courses in remote sensing and photogrammetry but does not offer a degree in either field, whereas the University of Miami, with only one remote sensing course, offers a minor and Ph. D. in remote sensing.

An example of the curriculum required for a Masters degree in photogrammetry is included as List E, taken from the pamphlet *Curriculum Information*, the Department of Geodetic Science, The Ohio State University.

There are no known programs in the United States or Canada similar to the South Australian Institute of Technology's graduate diploma in remote sensing, a two-year part-time graduate program that teaches remote sensing to professionals within the framework of their discipline. The program contains six courses: remote sensing I & II, applied interpretation I & II, and field assessment A & B. The first year of the program is concerned with the physical, environmental, and human factors of remote sensing data acquisition and interpretation and the interpretation of visual imagery. The second year covers non-photographic remote sensing techniques and the analysis of digital data. A good place for programs of this kind is the junior college, an excellent facil-

ity for training remote sensing and photogrammetric technicians.

Two American universities have developed innovative teaching techniques. Colorado State University videotapes its photogrammetry classes. The tapes are used by nonresident students at 21 cooperating institutions and seven county libraries in Colorado and Wyoming. Oregon State University's School of Forestry has developed a self-instruction approach to aerial photo-interpretation instruction. This course is "self-paced and is built around the unit mastery concept." The student must obtain a "B" (80 percent) in each unit and may retake an exam twice. In addition to the unit exams, two midterms, a final, a photo-mission report, and a landform map report are included in the grading scheme. The faculty at the University believes that this approach produces:

- (1) An increased mastery and longer retention of material over the lecture-lab approach;
- (2) A higher percentage of A's, B's, and I's, and fewer D's and F's;
- (3) More highly motivated students and greater student satisfaction, and;
- (4) More material covered in the same amount of time.

Classroom lectures of the various institutions are reinforced and supplemented by the use of readings in at least 64 textbooks (List F). The most widely used remote sensing/photointerpretation text is T. Eugene Avery's *Interpretation of Aerial Photographs* (1968) (List G). When included in the category of remote sensing, it is used in 39 percent of the courses. As a text on photointerpretation, it is used for 50 percent of the courses. The next most used text on photointerpretation is U. S. Geological Survey Professional Paper No. 373 by Richard G. Ray (1960), *Aerial photographs in geologic interpretation and mapping*. The photogrammetry text most widely used is Paul Wolf's *Elements of Photogrammetry* (1974).

Many instructors find no single text satisfactory for all their needs and consequently employ two required texts. Several instructors utilize only readings in various journals such as *Photogrammetric Engineering and Remote Sensing*, symposia proceedings, and textbooks.

The *Manual of Remote Sensing* (American Society of Photogrammetry, 1975) has been used at several institutions. The cost (\$22.50 to students), size (two volumes), and complexity of this work will probably preclude its becoming the leading remote-sensing text

in the United States, but it will continue to be used extensively as a reference book and for additional reading assignments for its excellent technical papers by leading researchers.

Several remote-sensing texts are being prepared for publication. They include works by Floyd Sabins, Chevron Oil Research; David Simonett, University of California at Santa Barbara; and Alan Gillespie and Barry S. Siegal, Jet Propulsion Laboratory. Sabins' text will include a workbook that has interpretation exercises keyed to the text. The workbook will contain unannotated images not included in the text. This is a needed instructional aid at present, especially at institutions where the instructors are new to remote sensing and are unaware of the many sources of data.

Visual aids are available in formats that provide the instructor with selected 35-mm slides of satellite, aircraft, ground, and microscope data of various areas from several sensors and involving many scientific problems. Facilities where slides can be obtained without permission of the author or the U.S. Geological Survey include: Pilot Rock Inc., Arcata, California; the EROS Data Center USGS, Sioux Falls, South Dakota; the Technology Applications Center, University of New Mexico, Albuquerque, New Mexico; John Wiley & Sons (slides by Norman Gillmeister and Barry Siegal); McGraw-Hill (slides by John S. Shelton); and Purdue University, Laboratory for the Applications of Remote Sensing, West Lafayette, Indiana.

A wide range of remote sensing and photogrammetry equipment, from pocket stereoscopes to analytical stereoplotters, is available to students at institutions in the United States and Canada, and a few schools utilize their own aircraft to acquire specialized data. In addition to internal resources, several institutions maintain a close working relation with federal, state, and commercial agencies. Only one formal internship was found in the survey, an arrangement of South Dakota State University with the U.S. Geological Survey EROS Data Facility, Sioux Falls, South Dakota.

The American Society for Engineering Education (ASEE) annually publishes a summary and analysis of engineering research and graduate study activities of the 195 ASEE member institutions in its journal, *Engineering Education*. The list does not represent all engineering research projects, since all institutions are not members, and all of those surveyed do not subdivide their

projects into specific disciplines such as remote sensing and photogrammetry. Many of the subdivisions have peripheral applications to remote sensing. Readers interested in specialized areas are referred to the journal of the American Society of Engineering Education and to the various engineering departments.

The ASEE indicated that Remote Sensing/Photogrammetry engineering research projects³ were underway at at least 27 institutions in the 1973-1974 school year (*Engineering Education*, 1974) and 31 institutions in the 1974-1975 school year (*Engineering Education*, 1974) and 31 institutions in the 1974-1975 school year (*Engineering Education*, 1975) (List H). There were more than 122 research projects in the 1973-1974 time period and 110 in the 1974-1975 time period.

The author wishes to thank Mrs. Carolyn Waller and Mrs. Velma Jean Reed for their help in the preparation of this paper. The cooperation of the institutions and individuals who made this paper possible is greatly appreciated, especially Dr. Philip J. Howarth, who helped with the gathering of information on Canadian programs.

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³ Note: Research projects of an applications nature are not included in this paper; only basic engineering research projects are listed.

LIST A

REMOTE SENSING/PHOTOGRAMMETRY AND RELATED COURSES AT INSTITUTIONS IN THE UNITED STATES

NOTE: Asterisk (*) denotes the discipline credited with courses listed under departments having multiple disciplines. Universities are listed alphabetically by state.

LEGEND

RS—Remote Sensing
 RSr—Remote Sensing related
 PI—Photo-Interpretation
 PIr—Photo-Interpretation related
 PG—Photogrammetry
 PGr—Photogrammetry related

MPI—Map & Photo-Interpretation
 PGe—Photogeology
 AG—Astrogeology
 SD—Systems Design
 IP—Image Processing
 OP—Optics

ALABAMA

Univ. of Alabama

Dept. of Geography
 #420 Air Photo Interp. (PI)

Auburn Univ.

Dept. of Forestry
 #417 Photogrammetry (PG)
 5 Qtr. hrs. UGrad/Grad
 #617 Remote Sensing (RS)
 3 Qtr. hrs.
 #691 Directed Study (PI,
 1-5 Qtr. hrs. RS)

Dept. of Civil Eng.
 #400 Advanced Surveying
 and Mapping (PGr)
 5 Qtr. hrs. UGrad

Dept. of Elec. Eng.
 #646 Pattern Recognition (SD)
 3 Qtr. hrs. Grad

Univ. of South Alabama

Dept. of Geography
 #331 Methods of Geographic
 Research (PIr)
 5 Qtr. hrs.

ALASKA

Univ. of Alaska-Fairbanks

Dept. of Civil Eng.
 #412 of Elements of Photogrammetry (PG)
 3 Sem. hrs. UGrad

Dept. of Geology
 #408 Photogeology (PGe)
 3 Sem. hrs.
 #494 Geoscience Applications of Remote
 Sensing (RS)
 3 Sem. hrs. UGrad/Grad
 Evening

ARIZONA

Univ. of Arizona

Dept. of Civil Eng.
 #254 Photogrammetry (PG)
 3 Sem. hrs. UGrad/Grad

Dept. of Geography and Area Development
 #298 Geographical Applications of
 Remote Sensing (RS)

Dept. of Geosciences
 #207 Photogeology (PGe)
 3 Sem. hrs. UGrad/Grad
 #207 Applied Multispectral Imagery (RS)
 2 Sem. hrs. Grad

Dept. of Watershed Mgt.

#220a Photogrammetry (PG)
 2 Sem. hrs. UGrad/Grad
 #220b Photointerpretation (RS)
 2 Sem. hrs. UGrad/Grad
 #298b Applications of Remote Sensing
 and Computer Mapping (RS)
 UGrad/Grad

Dept. of Optical Sciences

#230 Introduction to Remote Sensing (RS)
 #231 Photographic Remote Sensing (SD)
 3 Sem. hrs.
 #233 Photo-Electronic Imaging
 Devices (SD)
 3 Sem. hrs.
 #235 Automatic Information Extraction
 and Classification (IP)
 3 Sem. hrs.
 #238 Radiometry (RS)
 3 Sem. hrs.
 #239 Infrared Techniques (SD)
 3 Sem. hrs.
 #266 Optical Detectors (SD)
 3 Sem. hrs.
 #267 Photographic Processes (OP)
 3 Sem. hrs.
 #267L Photographic Processes
 Laboratory (OP)
 1 Sem. hr.
 #332 Optical Properties of the
 Atmosphere and Ocean (OP)

Dept. of Atmospheric Sciences

#356a-356b Atmospheric Optics and
 Radiation (OP)
 3 Sem. hrs.
 #361 Radar Meteorology (RS)
 3 Sem. hrs.
 #385 Principles of Atmospheric Remote
 Sensing (RS)
 3 Sem. hrs.

Arizona State Univ.

Dept. of Geography

#575 Geographic Applications of Remote
 Sensing (RS)
 3 Sem. hrs.

Northern Arizona Univ.

Dept. of Engineering

#330 Photogrammetry (PG)
 3 Sem. hrs.

- Dept. of Geography
 #418 Remote Sensing Techniques (RS)
 4 Sem. hrs.
 #419 Remote Sensing Techniques (RS)
 #420 Remote Sensing
 Techniques-Methodology (RS)
 2 Sem. hrs. Trips
 Dept. of Forestry
 #524 Airphoto Interp. (PI)
 3 Sem. hrs. Grad
- Phoenix College*
 Dept. of Engr. Science
 #242 Topographical Surveying (PG)
 3 Sem. hrs.
 Dept. of Civil Technology
 #205 Introduction to
 Photogrammetry (PG)
 3 Sem. hrs.
 #248 Geodetic Surveying (PGr)
 3 Sem. hrs.
- Central Arizona College—Coolidge*
 Dept. of Civil Technology
 #220 Photogrammetry (PG)
 3 Hrs. UGrad
- Arizona College of Technology*
 Dept. of Civil Eng. Tech.
 #202 Surveying II (PGr)
 4 Sem. hrs.
- ARKANSAS
- University of Arkansas—Monticello*
 Dept. of Forestry
 #4653 Photogrammetry and
 Photointerpretation (RS)
 3 Sem. hrs. UGrad Trips
- CALIFORNIA
- Allan Hancock College—Santa Maria*
 Dept. of Engineering
 #7B Surveying (PGr)
 3 Units Trips
- California State Univ. at Chico*
 Dept. of Geological* and Physical Science
 #301 Remote Sensing (RS)
- California State Univ. at Fresno*
 Dept. of Civil Eng.
 Photogrammetric Instrumentation (PG)
 Dept. of Geography
 Advanced Air Photo Interp. and Remote
 Sensing (RS)
 3 Hrs. UGrad/Grad Trips
 Dept. of Geology
 Map and Photo Interp. (MPI)
 4 Sem. hrs. UGrad/Grad
- California State Univ. at Northridge*
 Dept. of Geosciences
 #331 Photogeology (PGe)
 1 Sem. hr. UGrad Trips
- California State Univ. at Sacramento*
 Dept. of Elec. Eng. of School of
 Engineering
 #187 Environment Remotely-Sensed
 Using Satellites-Aircraft (RS)
 3 Sem. hrs. UGrad Trips
- City College of San Francisco*
 Dept. of Engineering
 #196 Photogrammetry (PG)
 UGrad Trips Evening
- Columbia Jr. College—Columbia*
 Dept. of Natural Resources
 Technology Aerial Photography and Map
 Interp. (MPI)
 3 Qtr. hrs. UGrad Trips
- Feather River College—Quincy*
 Dept. of Timber Technician-Forestry
 #57 Maps and Aerial Photo Interp. (MPI)
 3 Sem. hrs.
- Foothill College—Los Altos Hills*
 Dept. of Geology
 #14 Map Reading and Aerial Photo
 Interp. (MPI)
 2 Qtr. hrs.
 Planetary Geology (AG)
 3 Qtr. hrs. UGrad Trips
- Fullerton College*
 Dept. of Civil Engineering Technology
 #2 Aerial Photo Interp. (PI)
 3 Sem. hrs.
 Dept. of Earth Sciences
 Planetary Geology (AG)
 3 Sem. hrs.
- Humboldt State Univ.—Arcata*
 Dept. of Forestry
 #106 Aerial Photogrammetry (RS)
 4 Qtr. hrs. UGrad Trips
 Dept. of Geography
 #196 Remote Sensing (RS)
 4 Qtr. hrs. UGrad/Grad Trips
- Pasadena City College*
 Dept. of Eng. & Tech.
 #170 Photogrammetry (PG)
 6 Sem. hrs. UGrad Trips Evening
 #170A Photogrammetry (PG)
 3 Sem. hrs. UGrad Trips
 #170B Photogrammetry (PG)
 3 Sem. hrs. UGrad
 #170C Photogrammetry (PG)
 4 Sem. hrs. UGrad
 #170D Photogrammetry (PG)
- Pomona College*
 Dept. of Geology
 Planetary Geology (AG)
 4 Sem. hrs. UGrad Trips
- San Diego State Univ.*
 Dept. of Geography
 #587 Remote Sensing of the
 Environment (RS)
 3 Sem. hrs. UGrad/Grad
 #588 Adv. Remote Sensing of the
 Environment (RS)
 3 Sem. hrs. UGrad/Grad
 #687 Seminar in Remote Sensing of the
 Environment (RS)
 3 Sem. hrs. Grad
 Dept. of Geology
 #505 Photogeology (PGe)
 3 Sem. hrs. UGrad/Grad Trips

- San Jose State Univ.*
 Dept. Of Geography
 Fundamentals of Remote Sensing of the Environment (RS)
 3 Sem. hrs. UGrad/Grad Trips
- Santa Ana College*
 Photogrammetry (PG)
- Stanford University*
 Dept. of Applied Earth Sciences
 #Airborne Exploration: Advanced Photogeologic and Radar Techniques (RS)
 3-4 Hrs. UGrad
 #133 Remote Sensing of Environment (RS)
 3 Hrs. UGrad
- Univ. of California-Berkeley*
 Dept. of Civil Engineering
 #101 Elementary Photogrammetry (PG)
 4 Qtr. hrs. UGrad
 #107 Air Photo Analysis and Interp. (PI)
 4 Qtr. hrs. UGrad
 #287A Analytic Photogrammetry I (PG)
 4 Qtr. hrs. Grad
 #287B Analytic Photogrammetry II (PG)
 4 Qtr. hrs. Grad
 #288A Stereoscopic Plotting Instruments (PG)
 4 Qtr. hrs. Grad
 #288B Stereotriangulation and Adjustment (PG)
 4 Qtr. hrs. Grad
 #289 Adjustment Computations (PG)
 4 Qtr. hrs. Grad
 #299 Individual Research (PG)
 2-5 Qtr. hrs. Grad
 Group Studies in Photogrammetry and Surveying (pgr)
 2-5 Qtr. hrs.
- Dept. of Forestry
 #202 Advanced Photographic Interp. (PI)
 3 Qtr. hrs. Grad
- Dept. of Forestry & Resource Mgt.
 #102 Forest Photogrammetry and Photo Interp (RS)
 4 Sem. hrs. UGrad Trips
- Univ. of California-Davis*
 Dept. of Geography
 #106 Interpretation of Aerial Photographs (PI)
 4 Qtr. hrs. UGrad
- Univ. of California-Los Angeles*
 Dept. of Geography
 Remote Sensing of the Environment (RS)
 4 Qtr. hrs. UGrad/Grad
- Dept. of Geology
 Remote Sensing for Earth Scientists (RS)
 3 Qtr. hrs. Trips Evening
- Univ. of California-Riverside*
 Dept. of Earth Sciences
 (Geography Program)
 #158 Remote Sensing of the Environment (RS)
 4 Qtr. hrs. UGrad/Grad
- Univ. of California-Santa Barbara*
 Dept. of Geography
 Geographic Remote Sensing Techniques (RS)
 #116A Geographic Photo Interp. (PI)
 4 Qtr. hrs. UGrad Trips
- Univ. of Southern California*
 Dept. of Geology
 Remote Sensing for Earth Scientists (RS)
 3 Sem. hrs. Grad Trips Evening
- COLORADO
- Fort Lewis College-Durango*
 Dept. of Geology
 #423 Photogeology (PGe)
 3 Sem. hrs. Trips
- Colorado School of Mines*
 Dept. of Geology
 #540 Photogeology (PGe)
 3 Sem. hrs. Grad Trips
 #545 Introduction to Remote Sensing (RS)
 3 Sem. hrs.
 #546 Geologic Applications of Remote Sensing (RS)
 #600 Seminar on Geologic Remote Sensing (RS)
 2 Sem. hrs.
- Dept. of Geophysics
 #525 Airborne Geophysical Prospecting (RS)
 2 Sem. hrs. Grad
- Colorado State Univ.*
 Dept. of Atmospheric Science
 #722 Atmospheric Radiation and Energetics (RS)
 3 Sem. hrs. Grad
 #737 Satellite Observation of the Atmosphere and Earth (RSr)
 3 Sem. hrs. Grad
 #775 Atmospheric Photochemistry and Kinetics (RSr)
 3 Sem. hrs. Grad
- Dept. of Civil Eng.
 #572 Photogrammetry (PG)
 3 Sem. hrs. UGrad/Grad
 #573 Imagery Interp. for Engineers (RS)
 3 Sem. hrs. UGrad/Grad
- Dept. of Computer Science
 #530 Pattern Recognition (IP)
 4 Sem. hrs. Grad
- Dept. of Earth Resources
 #402 Principles of Remote Sensing (RS)
 2 Sem. hrs. UGrad
 #404 Resource Information Analyses (RSr)
 3 Sem. hrs. UGrad
 #502 Physical Principles of Remote Sensing (RS)
 4 Sem. hrs. Grad
 #504 Computer Analysis and Modeling of Remote Sensing Images (IP)
 3 Sem. hrs. Grad
 #702 Remote Sensing of Regional Resources (RS)
 4 Sem. hrs. Grad

- Dept. of Forest and Wood Sciences
#421 Forest Photogrammetry and Photo
Interp. (PI)
2 Sem. hrs. UGrad
- Interdepartmental Remote Sensing Program
#323 A Survey of Remote Sensing and
Photogrammetry (RS,
3 Sem. hrs. UGrad PG)
- Adam State-Alamosa*
Dept. of Geography
#310 Interpretation of Maps and Remote
Sensing (RS)
3 Qtr. hrs.
- United States Air Force Academy*
Dept. of Economics, Geography* and
Management
#383 Geographic Application of Imagery
Analyses (RS)
UGrad
- Univ. of Denver*
Dept. of Geography
Remote Sensing (RS)
5 Qtr. hrs. UGrad/Grad Trips
- CONNECTICUT
- Eastern Connecticut State College*
Earth Science Dept. Map and
Photointerp. (MPI)
- Yale Univ.*
Dept. of Forest Mensuration and
Operations Analysis Interp. of Aerial
Photographs (PI)
#317a Terrestrial Photogrammetry and
Remote Sensing (RS)
3 Hrs.
- DELAWARE
- Univ. of Delaware*
College of Marine Studies
#672 Remote Sensing of Earth
Resources (RS)
UGrad/Grad Trips Evening
#681 Remote Sensing of
Environment (RS)
3 Sem. hrs. UGrad/Grad Trips Evening
Special Problems in Remote Sensing (RS)
3 Sem. hrs. UGrad/Grad Trips Evening
- DISTRICT OF COLUMBIA
- The American Univ.*
Dept. of Biology
Remote Sensing Applications in
Ecology (RS)
UGrad/Grad
- Washington Tech. Institute*
Dept. of Geoscience
Remote Sensing (RS)
1 Sem. hrs. UGrad Trips
- FLORIDA
- Florida Atlantic Univ.*
Dept. of Geography
#470 Remote Sensing of
Environment (RS)
4 Hrs.
- #471 Research in Remote Sensing of
Environment (RS)
4 Qtr. hrs.
- Dept. of Geology
#536 Air Photo Analysis (PI)
3 Qtr. hrs. Grad
- Univ. of Florida*
School of Forest Resources and
Conservation
#346 Forest Photogrammetry (PI)
4 Qtr. hrs. UGrad Trips
- Dept. of Geography
#401/501 Air Photo Interp. (RS)
5 Qtr. hrs. UGrad/Grad Trips
- Miami-Dade Jr. College*
Dept. of Civil Engineering
Technology Photogrammetry (PG)
3 Sem. hrs. UGrad
- Univ. of Miami*
Dept. of Mechanical Eng.
#590 Environmental Remote Sensing (RS)
3 Sem. hrs.
- GEORGIA
- Univ. of Georgia*
Dept. of Geography
#420/620 Use and Interp. of Aerial
Photographs (PI)
5 Qtr. hrs. UGrad/Grad Trips
#422/622 Advanced Photogrammetry (PG)
Trips
#423/623 Remote Sensing of
Environment (RS)
5 Qtr. hrs. UGrad/Grad
#825/826/827 Problems in Remote
Sensing of Environment (RS)
3 Qtr. hrs. Grad
- Georgia Institute of Technology*
Dept. of Civil Engineering
Remote Sensing Evaluation (RS)
3 Qtr. hrs. Grad Trips Evening
- Georgia Southern College*
Dept. of Geology
#399 Selected Topics in Geology; Aerial
Photograph Interp. (PI)
2 Qtr. hrs. UGrad
- HAWAII
- Univ. of Hawaii-Manoa*
Dept. of Geography
#470 Remote Sensing (RS)
UGrad/Grad
#750 Seminar in Remote Sensing (RS)
UGrad/Grad
- IDAHO
- Univ. of Idaho*
Dept. of Civil Eng.
Photogrammetry and Photo Interp. (PI)
3 Sem. hrs. UGrad
- Dept. of Forest Resources
#300 Forest Resource Measurements (PI)
1 Sem. hr. UGrad Trips Evening
#375-575 Aerial Photo Interp. of
Renewable Natural Resources (PI)
2 Sem. hrs. UGrad/Grad

#404-01 Remote Sensing of Environment (RS)
 2 Sem. hrs. UGrad/Grad
 #573 Advanced Aerial Photo Interp. (PI)
 2-3 Sem. hrs. UGrad/Grad Trips
 Directed Studies in Aerial Photo Interp./Remote Sensing (RS)
 Arrange sem-hr UGrad/Grad Trips

Dept. of Geosciences
 #591 R Aerogeology and Remote Sensing (RS)
 3 Sem. hrs. UGrad/Grad
 Dept. of Mechanical Eng.
 #587 Engineering Optics (OP)
 3 Cr. hrs. Grad
 #687 Advanced Eng. Optics (OP)
 3 Cr. hrs. Grad

ILLINOIS

Augustana College-Rock Island
 Dept. of Geography
 #213 Introduction to Aerial Photographs (PI)
 2 Qtr. hrs. UGrad
Univ. of Illinois
 Dept. of Agronomy
 #306 Dynamics of Soil Development (RSr)
 3 Sem. hrs. UGrad/Grad Trips
Northern Illinois Univ.
 Dept. of Geography
 Advanced Remote Sensing of the Environment (RS)
 3 Sem. hrs. UGrad/Grad Trips
 Remote Sensing of the Environment (RS)
 3 Sem. hrs. UGrad Trips

IOWA

Iowa State Univ.
 Dept. of Aerospace Eng.
 Remote Sensing: Measurements from Space (RS)
 3 Qtr. hrs. Grad
 Dept. of Civil Eng.
 #315 General Photogrammetry and Photo-Interp. (PI)
 3 Qtr. hrs. UGrad/Grad
 #414 General Photogrammetry and Photo-Interp. (PI)
 #418 Stereo-Photogrammetry (PG)
 3 Qtr. hrs. UGrad/Grad
 #419X-Remote Sensing (RS)
 #510 Analytical Photogrammetry (PG)
 #516 Advanced Topics in Photogrammetry and Photointerp. (PG)
 #519 Remote Sensing of the Environment and Earth resources (RS)
 #562 Airphoto Interp. of Engineering Soils (PI)
 Dept. of Electrical Eng.
 #533 Modern Eng. Optics (OP)
 3 Qtr. hrs. Grad
 Dept. of Forestry
 #445 Forest Photogrammetry and Photo-Interp. (RS)
 #590G Forest Mensuration and Photogrammetry (PG)
 2-5 Qtr. hrs. Grad
 Dept. of Geology
 #407 Geologic Interp. of Aerial Photographs (PGe)
Univ. of Iowa
 Dept. of Geography
 Environmental Impact Studies (RSr)
 3 Sem. hrs. UGrad/Grad
 Dept. of Geology
 Geologic Remote Sensing (RS)
 3 Sem. hrs. UGrad/Grad
 #12:106 Photogeology and Geologic Map Interp. (PGe)
 UGrad/Grad

INDIANA

Indiana Univ/Purdue Univ.-Indianapolis
 Dept. of Geology
 Maps and Air Photos (MPI)
 3 Sem. hrs. UGrad
Indiana Univ.-Bloomington
 Dept. of Geography
 #235 Maps and Aerial Photographs (MPI)
 3 Sem. hrs. UGrad
Indiana Univ/Purdue Univ.-Fort Wayne
 Dept. of Earth and Space Sciences
 #490 Seminar in Remote Sensing and Photogeology (RS)
 2 Sem. hrs. UGrad
Purdue Univ.
 Dept. of Civil Engineering
 #503 Photogrammetry (PG)
 3 Sem. hrs. Grad
 #567 Airphoto Interp. (PI)
 3 Sem. hrs. Grad
 #603 Advanced Photogrammetry (PG)
 Grad
 #604 Analytical Photogrammetry (PG)
 3 Sem. hrs Grad
 #667 Advanced Airphoto Interp. (PI)
 3 Sem. hrs. Grad Trips
 Dept. of Electrical Eng.
 #577 Engineering Aspects of Remote Sensing (RS)
 3 Sem. hrs. UGrad/Grad
 Dept. of Forestry* and Conservation
 #557 Aerial Photo Interp. (PI)
 3 Sem. hr.
 #558 Remote Sensing of Natural Resources (RS)
 3 Sem. hrs. Grad
 #579 Remote Sensing Seminar (RS)
 0 or 1 Sem. hr. Grad

KANSAS

Univ. of Kansas
 Depts. of Geology,* Geography and Elec. Eng. Remote Sensing (RS)
 3 Sem. hrs. UGrad/Grad
Wichita State Univ.
 Dept. of Geology
 Map and Air Photo Interp. (MPI)
 3 Sem. hrs. UGrad Trips

KENTUCKY

- Univ. of Kentucky*
 Dept. of Civil Eng.
 #523 Photogrammetry (PG)
 UGrad/Grad Trips
 #621 Terrain Analysis (PIr)
 Grad
- Western Kentucky Univ.*
 Dept. of Geography* and Geology
 Airphoto Interp. (PI)
 UGrad/Grad Trips Evening
 Remote Sensing of Environment (RS)
 UGrad/Grad

LOUISIANA

- Louisiana State Univ.-Baton Rouge*
 Dept. of Civil Eng.
 Geodetic and Photogrammetric
 Surveying (PG)
 3 Sem. hrs. UGrad
- Dept. of Geography* and Anthropology
 #4019 Air Photo Interp: Cultural
 Features (PI)
 3 Cr. hrs. UGrad/Grad Trips
 #4020 Air Photo Interp: Physical
 Features (PI)
 3 Cr. hrs. Trips
 #4045 Environmental Remote
 Sensing (RS)
 3 Cr. hrs. UGrad/Grad Trips
- Louisiana Tech Univ.*
 Dept. of Civil Eng.
 #304 Remote Sensing (RS)
 2 Sem. hrs. UGrad
- Tulane Univ.*
 Dept. of Earth Sciences Astrogeology (AG)
 3 Sem. hrs. UGrad/Grad

MAINE

- Univ. of Maine*
 Dept. of Forest Resources
 #6 Photogrammetry and Remote Sensing
 of Natural Resources (RS)
 UGrad/Grad Trips
 #106 Photogrammetry (PG)
 UGrad/Grad Trips Evening

MARYLAND

- Univ. of Maryland*
 Dept. of Geography
 Air Photo and Topographic Map
 Interp. (MPI)

MASSACHUSETTS

- Harvard Univ.*
 Dept. of Landscape
 Architecture
 #4-2a Air Photo Interp. (PI)
 2 Sem. hrs. Grad Trips
 #4-2b Remote Sensing (RS)
 2 Sem. hrs. Grad Trips
- Massachusetts Inst. of Tech.*
 Dept. of Earth and Planetary Sciences
 Remote Sensing of the Earth (RS)
 23 Sem. hrs. UGrad/Grad

Southern Massachusetts Univ.

- Dept. of Elec. Eng.
 #573 Pattern Recognition (IP)
 3 Sem. hrs. UGrad/Grad
 #574 Topics in Digital Signal
 Processing (IP)
 3 Sem. hrs. UGrad/Grad
 #578 Picture Processing by
 Computers (IP)
 3 Sem. hrs. UGrad/Grad

MICHIGAN

- Eastern Michigan Univ.*
 Dept. of Geography*-Geology
 #505 Aerial Photo Interp.-Remote
 Sensing (RS)
 2 Sem. hrs. Grad Trips Evening
- Grand Valley State College-Allendale*
 Dept. of Geology
 Remote Sensing (RS)
 UGrad
- Michigan State Univ.*
 Dept. of Geography
 #224 Remote Sensing: Airphoto
 Interp. (PI)
 UGrad/Grad
 #424 Remote Sensing (RS)
 UGrad/Grad Trips Evening
 #818 Readings in Geography: Convert,
 Passive and Synthetic Aperture
 Sensors (RS)
 #818 Readings in Geography: Computer
 Interp. of Remote Sensors and Pattern
 Articulation Analysis (IP)
 Grad
 #818 Radings in Geography:
 Multispectral Remote Sensing (RS)
- Michigan Technological Univ.*
 Dept. of Forestry
 #455 Aerial Photography Interp. in
 Forestry (PI)
 UGrad/Grad
- Univ. of Michigan-Ann Arbor*
 Dept. of Civil Eng.
 #560 Photogrammetry (PG)
 2 Sem. hrs. UGrad/Grad
- Dept. of Electrical* and Computer Eng.
 #476 Noncoherent Optical Technology
 I (OP)
 3 Sem. hrs. UGrad/Grad
 #477 Coherent Optics Lab (OP)
 2 Sem. hrs.
 #478 Environmental Remote Sensing
 Systems (RS)
 3 Sem. hrs. UGrad/Grad
- Dept. of Natural Resources
 #441 Remote Sensing of
 Environment (RS)
 4 Sem. hrs.
 #541 Principles of Radiation for Remote
 Sensing (RS)
 3 Sem. hrs.
 #542 Optical Sensors and
 Instrumentation (RS)
 3 Sem. hrs.

- #543 Radar Sensors and Instrumentation (RS)
Univ. of Michigan-Flint
 Dept. of Physical Geography
 Remote Sensing in Environmental Analysis (RS)
 3 Sem. hrs. UGrad Trips
- MINNESOTA
Carleton College-Northfield
 Dept. of Geology
 #70 Studies in Photogrammetric Techniques (PI)
 6 Sem. hrs. UGrad Trips
Mankato State Univ.
 Dept. of Geography
 #4714/5714 Aerial Photo Interp. (PI)
 4 Qtr. hrs. UGrad/Grad
 #4893/5893 Geographic Techniques: Remote Sensing (RS)
 Trips Evening
Univ. of Minnesota
 Dept. of Civil* and Mineral Engineering
 #5-104 Photogrammetry (PG)
 4 Qtr. hrs. UGrad/Grad Trips Evening
 Dept. of Forestry
 #5-200 Aerial Photo Interp. (PI)
 4 Qtr. hrs. UGrad/Grad
 #5-202 Photo Interp., Forest Inventory (PI)
 4 Qtr. hrs. UGrad/Grad
 #5-252 Remote Sensing of Natural Resources (RS)
 4 Qtr. hrs. UGrad/Grad
 #8-205 Research Problems: Photogrammetry, Remote Sensing (RS, PG)
 Arranged credits
- MISSISSIPPI
Mississippi State Univ.
 Dept. of Civil Eng.
 #3243 Aerial Photogrammetry (PG)
 #4263 Aerial Surveying (PG)
 3 Sem. hrs.
 Dept. of Forestry
 #5513 Forest Photogrammetry (PI)
 3 Sem. hrs.
 #5543 Remote Sensing Applications (RS)
 3 Sem. hrs. UGrad/Grad Trips
Univ. of Southern Mississippi
 Dept. of Geography* and Area Development
 #412/512 Remote Sensing of Environment (RS)
 UGrad/Grad Trips
- MISSOURI
Univ. of Missouri-Rolla
 Dept. of Geology and Geophysics
 #389 Remote Sensing of Geological Resources (RS)
 3 Sem. hrs.
 #399 Astrogeology (AG)
 #455 Photogeology (PG)
 3 Sem. hrs.
- Washington Univ.-St. Louis*
 Dept. of Earth and Planetary Sciences
 Remote Sensing of Environment (RS)
 3 Sem. hrs. UGrad/Grad
- NEBRASKA
Univ. of Nebraska-Lincoln
 Conservation and Survey Div.
 Remote Sensing of the Environment (RS)
 3 Sem. hrs. UGrad/Grad Trips Evening
Univ. of Nebraska-Omaha
 Dept. of Geography* and Geology
 #463-863 Map and Air Photo Interp. (MPI)
 3 Sem. hrs. UGrad/Grad Trips Evening
- NEVADA
Univ. of Nevada-Reno
 Division of Renewable Natural Resources, Coll. of Agriculture
 #443-742 Remote Sensing of Renewable Natural Resources (RS)
 Trips
- NEW HAMPSHIRE
Dartmouth College
 Dept. of Geography
 #25 Remote Sensing: Seminar (RS)
 UGrad Trips
 #82 Advanced Research in Remote Sensing (RS)
 UGrad
New England College-Henniker
 Dept. of Eng.
 Photogrammetry and Aerial Photo Interp. (PI)
Univ. of New Hampshire
 Institute of Natural* and Environmental Resources
 #757 Basics of Remote Sensing (RS)
 2 Sem. hrs. UGrad/Grad Trips Evening
 #758 Applications of Remote Sensing (RS)
 2 Sem. hrs. UGrad/Grad Trips Evening
- NEW JERSEY
Rutgers Univ.
 Dept. of Geography
 Remote Sensing of Earth Resources (RS)
 3 Hrs. Trips
 Dept. of Geology
 Geology of the Moon and Planets (AG)
 3 Hrs.
- NEW MEXICO
Eastern New Mexico Univ.
 Dept. of Geology Photogeology (PG)
 3 Sem. hrs. UGrad/Grad Trips
New Mexico State Univ.
 Dept. of Earth Sciences
 #481 Remote Sensing (RS)
Univ. of New Mexico
 Dept. of Geography
 #373 Map Reading and Air Photo Interp. (MPI)
 #482 Remote Sensing (RS)

Dept. of Geology
#455L Air Photogrammetry and
Photogeology (PGe)
3 Sem. hrs.

NEW YORK

Brooklyn College-CUNY

Dept. of Geology
Air Photo and Map Interp. (MPI)

Brown Univ.

Dept. of Geological Sciences
#5 Earth, Moon and Mars (AG)
3 Sem. hrs. UGrad

Columbia Univ.

Dept. of Geography
Introduction to Geographical Applications
of Remote Sensing (RS)
3 Sem. hrs. UGrad/Grad

Cornell Univ.

Dept. of Natural Resources
#421 Remote Sensing of Natural
Resources (RS)
2 Sem. hrs. UGrad/Grad

School of Civil* and Environmental Eng.

#IIA661 Photogrammetry (PG)
3 Sem. hrs. UGrad/Grad
#IIA662 Analytic Aerotriangulation (PG)
3 Sem. hrs. Ugrad/Grad
#IIA671 Geodesy (PG)
3 Sem. hrs. UGrad/Grad
#IIA671 Geodesy
3 Sem. hrs. UGrad/Grad
#IIA685 Physical Environment
Evaluation (PI)
3 Sem. hrs. Ugrad/Grad
#IIA686 Advanced Physical
Environment (RS)
3 Sem. hrs. UGrad/Grad
#IIA687 Analyses and Interp. of Aerial
Photographs (PI)
3 Sem. hrs. UGrad/Grad
#IIA688 Advanced Interp. of Aerial
Photographs (PI)
3 Sem. hrs. UGrad/Grad
#IIA689 Remote Sensing (RS)
3 Sem. hrs. UGrad/Grad
#IIA696 Seminar in Remote Sensing (RS)
1 Sem. hr. UGrad/Grad

Lehman College-CUNY

Dept. of Geology* and Geography
Air Photo Interp. (RS)
3 Sem. hrs. UGrad

Rensselaer Polytechnic Institute

Dept. of Static and Kinematic Design
#32.410 Photogrammetry (PG)
3 Sem. hrs.
Dept. of Systems and Power Engineering
#38.620 Voice and Image Processing (IP)
3 Sem. hrs.

St. Lawrence Univ.-Canton

Dept. of Geology* and Geography
Photo Interp. (PI)
4 Sem. hrs. UGrad Trips

SUNY-Albany

Dept. of Geography
#285 Introduction to Remote Sensing of
Environment (RS)
UGrad Trips
#485/585 Advanced Remote Sensing (RS)
UGrad/Grad
#685 Seminar in Remote Sensing (RS)
Grad Trips Evening

SUNY College-Cortland

Dept. of Geology
#590 Photogeology (PGe)
3 Sem. hrs. UGrad

SUNY College-Geneseo

Dept. of Geological Sciences
Geologic and Photogrammetric Interp. of
Aerial Photography (PGe)
3 Sem. hrs. UGrad

SUNY College-New Paltz

Dept. of Geography
Air Photo Interp. (PI)
4 Sem. hrs. UGrad Trips
Dept. of Geological Sciences
Photogeology and Remote Sensing (RS)
4 Sem. hrs. Grad

SUNY College-Oneonta

Dept. of Earth Science
Photogeology (PGe)
3 Sem. hrs. SUNY-Syracuse

Dept. of Forest Eng.

#352 Introduction to Remote Sensing (RS)
2 Sem. hrs. UGrad
#363 Photogrammetry (PG)
3 Sem. hrs. UGrad
#464 Photogrammetry II (PG)
3 Sem. hrs.
#563 Photogrammetry I (PG)
3 Sem. hrs.
#652 Remote Sensing Interp. (RS)
3 Sem. hrs. Grad
#655 Remote Sensing Measurements (RS)
3 Sem. hrs. Grad Theory of Errors and
Adjustments (PG)
Grad
Instrumental Photogrammetry I, Grad (PG)
Instrumental Photogrammetry II (PG)
Grad
Analytical Photogrammetry I (PG)
Grad
Analytical Photogrammetry II (PG)
Grad
Terrestrial and Non-Topographic
Photogrammetry (PG)
Grad

York College of the CUNY

Dept. of Natural Sciences
#449 Geologic Research (PG,
UGrad Trips (PI)

NORTH CAROLINA

Duke Univ.

Dept. of Computer Science
#210 Image Processing (IP)
3 Sem. hrs.
#250 Clustering and Classification (IP)
3 Sem. hrs.

- North Carolina A&T State Univ.*
 Dept. of Earth Science
 #408 Aerial Photointerp. (PI)
 3 Hrs. UGrad
- North Carolina State Univ.*
 Dept. of Civil Eng.
 #507 Air Photo Analysis (PI)
 3 Sem. hrs. Grad Trips
- Dept. of Forestry
 #353 Air Photo Interp. (PI)
 3 Sem. hrs. UGrad
- Dept. of Geosciences
 Photogeology (PGe)
 3 Sem. hrs.
- Univ. of North Carolina*
 Dept. of Geography*-Earth Science
 Air Photo-Remote Sensing Interp. (RS)
 3 Sem. hrs. Trips
- Western Carolina Univ.*
 Dept. of Earth Sciences
 Remote Sensing (RS)
 5 Qtr. hrs. Trips
- NORTH DAKOTA**
North Dakota State Univ.
 Dept. of Civil Eng.
 #481 Photogrammetry (PG)
 3 Sem. hrs. UGrad/Grad
- Univ. of North Dakota*
 Dept. of General Eng.
 #375 Remote Sensing Systems (RS)
 2 Sem. hrs. UGrad Trips Evening
- Dept. of Geography
 #375 Introduction to Remote Sensing (RS)
 3 Sem. hrs. UGrad Trips Evening
 #475 Remote Sensing Applications and
 Analysis (RS)
 2 Sem. hrs. UGrad/Grad Trips Evening
- OHIO**
Ashland College-Ashland
 Dept. of Earth Sciences
 #300 Air Photo Interp. (RS)
 UGrad
- Kent State Univ.*
 Dept. of Geography
 #49064/59064/79064
 Advanced Earth Imagery Interp. (RS)
 5 Sem. hrs. UGrad/Grad Trips
- Univ. of Akron*
 Dept. of Geography
 #355:488/548 Remote Sensing of the
 Environment (RS)
 3 Qtr. hrs. UGrad/Grad
- Dept. of Geology
 #337:404/504 Astrogeology (AG)
 4 Qtr. hrs. UGrad/Grad
- Ohio State Univ.*
 Dept. of Geodetic Science
 #505 Photogrammetry and Photo
 Interp. (PI)
 4 Qtr. hrs. UGrad/Grad
 #603 Remote Sensing (RS)
 4 Qtr. hrs. UGrad/Grad
- #604 Terrain Analysis (PI)
 4 Qtr. hrs. UGrad/Grad
 #624 Instrumentation in
 Photogrammetry (PG)
 4 Qtr. hrs. UGrad/Grad
 #626 Metric Photography (PG)
 4 Qtr. hrs. UGrad/Grad
 #627 Introduction to Advanced
 Photogrammetry (PG)
 5 Qtr. hrs. UGrad/Grad
 #650 Adjustment Computations I (PG)
 3 Qtr. hrs. UGrad/Grad
 #651 Adjustment Computations II (PG)
 #660 Geometric Photogrammetry (PG)
 3 Qtr. hrs. UGrad/Grad
 #688 Field Work in Photogrammetry (PG)
 5 Qtr. hrs. UGrad/Grad
 #778 Analog Photogrammetry (PG)
 5 Qtr. hrs. UGrad/Grad
 #779 Computational Photogrammetry (PG)
 4 Qtr. hrs. UGrad/Grad
 #780 Non-Conventional
 Photogrammetry (PG)
 4 Qtr. hrs. UGrad/Grad
 #782 Geodetic Applications of Digital
 Computers (PGr)
 4 Qtr. hrs. UGrad/Grad
 #802 Advanced Computational
 Photogrammetry (PG)
 4 Qtr. hrs. Grad
 #805 Advanced
 Stereophotogrammetry (PG)
 4 Qtr. hrs. Grad
 #822 Photogrammetry in Practice (PG)
 4 Qtr. hrs. Grad
 #826 Photo-Triangulation (PG)
 4 Qtr. hrs. Grad
 #872 Selenodesy and Lunar
 Mapping (PG)
 3 Qtr. hrs. Grad
- Wittenberg Univ.*
 Dept. of Geology
 Geomorphology and Aerial Photo
 Interp. (PIr)
 UGrad Trips
- Wright State Univ.*
 Dept. of Geography
 #261-4 Introduction to Remote
 Sensing (RS)
 UGrad/Grad Trips Evening
 #360/660-3 Systematic
 Geography: Problems in Map and Photo
 Interp. (MPI)
 Trips Evening
 #360/660-3 Systematic
 Geography: Problems in Remote
 Sensing (RS)
 Trips Evening
 #362/662-4 Remote Sensing of the
 Environment (RS)
 UGrad/Grad Trips Evening
 #399/699 Studies in Selected Subjects:
 Effects of the Atmosphere on Remote
 Sensing (RS)
 1-4 Qtr. hrs. UGrad/Grad

OKLAHOMA

Univ. of Oklahoma

- Dept. of Geography
 #2913 Cartography—Map and Photograph Analysis (MPI)
 UGrad
 #5613 Interp. of Aerial Photographs (PI)
 UGrad/Grad
- Dept. of Geology and Geophysics
 #5423 Aerogeology and Advanced Geomorphology (PGe)
 UGrad/Grad
 #5433 Aerial Photographs in Stratigraphic and Structural Study (PGe)
 UGrad/Grad
 #5443 Photogrammetry in Stratigraphic and Structural Study (PGe)
 #5883 Remote-Sensing Exploration (RS)
 UGrad/Grad
- Dept. of Meteorology
 #4413 Synoptic Meteorology (RSr)
 UGrad/Grad

Oklahoma State Univ.

- Dept. of Civil Eng.
 #4623 Photogrammetric Engineering (PG)
 UGrad/Grad
 #5623 Aerial Photographic Interp. (PI)
- Dept. of Forestry
 #3880 Aerial Photogrammetry (PI)
 1-3 Sem. hrs. UGrad

OREGON

Oregon State Univ.

- Dept. of Civil Eng.
 #362 Photogrammetry (PG)
 3 Qtr. hrs. UGrad
 #462 Photo Interp. (PI)
 3 Qtr. hrs. UGrad/Grad
 #561 Photogrammetry (PG)
 3 Qtr. hrs. Grad
 #656 Analytical Photogrammetry (PG)
 3 Qtr. hrs. Grad
- Dept. of Forest Mgt - School of Forestry
 Aerial Photo-Interp. (PI)
 3 Qtr. hrs. UGrad Trips
 Aerial Photo Mensuration (PI)
 3 Qtr. hrs. Grad

Univ. of Oregon

- Dept. of Geography
 #484 Air Photo Interp. and Remote Sensing (RS)
 3 Qtr. hrs. UGrad/Grad
- Dept. of Geology
 #473G Photogeology (PGe)
 3 Qtr. hrs. UGrad/Grad

PENNSYLVANIA

Indiana Univ. of Pennsylvania

- Dept. of Geography
 #490 Map and Photo Interp. (MPI)
 3 Hrs.

Lehigh Univ.

- Dept. of Geological Sciences
 #393 Photogeology and Remote Sensing (RS)
 1 Sem. hrs. UGrad/Grad

Mansfield State College

- Dept. of Geology
 Aerial Photo Interp. (PI)
 3 Sem. hrs. UGrad

Pennsylvania State Univ.

- Dept. of Agronomy
 #415 Soil Morphology, Mapping and Land Use (RSr)
- Dept. of Civil Eng.
 #112 Photogrammetry and Photointerp. (PI)
 #316 Photogrammetry and Photointerp. (PI)
 #512 Applied Soil Mechanics (PIr)

- Dept. of Electrical Eng.
 #530 Adaptive Systems and Pattern Recognition (IP)

- Dept. of Forestry
 #455 Aerial Photos in Forestry (PI)
 #597 Remote Sensing of Earth Resources (RS)

- Dept. of Geography
 #452 Interp. of Aerial Photographs (PI)
 #457 Geographic Data Systems (RS)

- Dept. of Geology
 #546 Principles of Photogeology (PGe)
 #596 Introduction to Remote Sensing and Air Photo Techniques (RS)

Univ. of Pittsburgh

- Dept. of Civil Eng.
 Geometronics (PGr)
 4 Sem. hrs. UGrad

Slippery Rock State College

- Dept. of Geology
 #231 Air Photo Interp. (PI)
 3 Sem. hrs. UGrad

PUERTO RICO

Inter American Univ. of Puerto Rico

- Dept. of Geography
 #301 Cartography and Aerial Photography (PIr)
 3 Sem. hrs.

RHODE ISLAND

Univ. of Rhode Island

- Dept. of Electrical Eng.
 #437 Introduction to Photo-electronic Devices (SD)
 3 Sem. hrs. Grad
- #506 Digital Signal Processing (IP)
 #511 Electromagnetic Fields (SD)
 3 Sem. hrs. Grad
 #520 Fourier Optics (OP)
 3 Sem. hrs. Grad
 #531 Solid State Engineering I (SD)
 3 Sem. hrs. Grad
 #532 Solid State Engineering II (SD)
 #535 Transistor Circuits (SD)
 3 Sem. Hrs. Grad

- #536 Semiconductor Electronics (SD)
3 Sem. hrs. Grad
- #538 Principles of Remote Sensing (RS)
3 Sem. hrs. Grad
- #539 Infrared Imaging Technique (RS)
3 Sem. hrs. Grad
- #636 Photo-electronics I (SD)
3 Sem. hrs. Grad
- #638 Photo-electronics II (SD)
- Dept. of Geology
#301 Environmental Remote Sensing (RS)
3 Sem. hrs. UGrad
- SOUTH CAROLINA**
Clemson Univ.—Clemson
Dept. of Civil Eng.
#417-617 Air Photo Interp. I (RS)
3 Sem. hrs. UGrad/Grad Trips
#419-619 Photogrammetry (PG)
3 Sem. hrs. UGrad/Grad Trips
#812 Air Photo Interp. II (RS)
3 Sem. hrs. Grad Trips
- Dept. of Forestry
#308, 608 Aerial Photographs in Forestry (PI)
3 Sem. hrs. UGrad/Grad Trips
- Univ. of South Carolina*
Dept. of Geography
#105 Maps and Aerial Photographs (MPI)
3 Sem. hrs.
- SOUTH DAKOTA**
South Dakota State Univ.
Dept. of Geography
#483 Air Photo Interp. (PI)
3 Sem. hrs. UGrad
#484 Remote Sensing (RS)
3 Sem. hrs. UGrad
#780 Seminar—Geographic Techniques: Advanced Remote Sensing (RS)
2-3 Sem. hrs. Grad
EROS Data Center Short Course—Remote Sensing (RS)
4 Sem. hrs.
- Dept. of Elec. Eng.
Automatic Signal Processing Methods (IP)
2 Sem. hrs. Grad
- Univ. of South Dakota*
Dept. of Earth Sciences*
Physics
Internship at the EROS Data Center (RS)
- TENNESSEE**
Austin Peay State Univ.
Dept. of Geology
#460 Astrogeology (AG)
1 Qtr. hr.
- Univ. of Tennessee Space Inst.*
Dept. of Civil Eng.
#4260 Photogrammetry (PG)
3 Qtr. hrs. Trips
- Dept. of Computer Sciences
#5840-50 Introduction to Pattern Recognition (IP)
- Dept. of Electrical Eng.
#5670 Introduction to Pattern Analysis (IP)
3 Qtr. hrs.
#4830 Image Processing by Computer (IP)
3 Qtr. hrs.
- Dept. of Environmental Eng.
#5260 Basic Principles of Remote Sensing (RS)
3 Qtr. hrs.
#5261 Remote Sensing Data Acquisition (RS)
3 Qtr. hrs.
#5262 Remote Sensing Data Analysis and Interp. (RS)
3 Qtr. hrs.
- Dept. of Forestry
#4340 Aerial Photography in Forest-Resource Mgt. (RS)
3 Qtr. hrs. UGrad/Grad Trips
- Dept. of Geography
#4740 Remote Sensing: Types and Applications (RS)
- Dept. of Geological Sciences
#4460 Geologic Photography and Photogrammetry (PGe)
4 Qtr. hrs.
#5460 Photogeologic Interp. (RS)
4 Qtr. hrs.
- Vanderbilt Univ.—Nashville*
Dept. of Geology
Remote Sensing (RS)
- The Univ. of the South*
Dept. of Forestry
Forest Mensuration (PI)
UGrad
- TEXAS**
Pan American Univ.—Edinburg
Dept. of Physical Science
#4101, 4102 Advanced Physics Lab (RS)
UGrad
- Stephan F. Austin State Univ.*
Dept. of Forestry
#441 Forest Photogrammetry (PI)
3 Sem. hrs. UGrad/Grad
#442 Advanced Photogrammetry (PG)
3 Sem. hrs. UGrad/Grad
#651 Forest Photo Mensuration (PI)
3 Sem. hrs.
#652 Remote Sensing of Natural Resources (RS)
3 Sem. hrs. UGrad/Grad
- Texas A&M Univ.*
Dept. of Bio-Sciences
#444 Remote Sensing in Renewable Natural Resources (RS)
3 Sem. hrs. UGrad
- Dept. of Civil Engr.
#470 Aerial Photogrammetry (PG)
#660 Photogrammetry (PG)
3 Sem. hrs.
- Dept. of Electronic Eng.
#659 Electro-Optical Systems Eng. (SD)
3 Sem. hrs.

- Dept. of Forest Science
#485 Photographic Interp. Verification and Mapping (PI)
1-4 Sem. hrs. UGrad/Grad Trips
- Depts. of Forest Science* and Civil Engr.
#661 Photo Interp. (PI)
3 Sem. hrs. Grad Trips
- Dept. of Geology
#633 Photogeology (RS)
3 Sem. hrs. Grad
- Dept. of Meteorology
#616 Remote Sensing of the Atmosphere (RS)
3 Sem. hrs. Grad
- #674 Radar Meteorology (RS)
3 Sem. hrs. Grad
- Radar Meteorology (RS)
2-3 Sem. hrs.
- Texas Tech Univ.*
Dept. of Geosciences
Remote Sensing Instrumentation (RS)
1 Sem. hr. UGrad/Grad
- Remote Sensing (RS)
3 Sem. hrs. UGrad/Grad Trips
- Univ. of Texas-Austin*
Dept. of Geography
#362K Remote Sensing of the Environment (RS)
UGrad Trips
- #393K Research in Remote Sensing (RS)
Grad Trips
- UTAH
Utah State Univ.
Dept. of Civil* and Environmental Eng.
Photogrammetry (PG)
3 Qtr. hrs. UGrad Trips
- Dept. of Geology
#564 Photogeology (PGe)
3 Qtr. hrs. UGrad/Grad Trips
- Univ. of Utah*
Dept. of Geography
#543 Advanced Remote Sensing-Remote Sensing of the Environment (RS)
3 Qtr. hrs. UGrad/Grad Trips Evening
- Remote Sensing (RS)
3 Qtr. hrs. UGrad/Grad Trips Evening
- Dept. of Civil Eng.
#501 Photogrammetry (PG)
3 Qtr. hrs. UGrad Trips
- VERMONT
Middlebury College-Middlebury
Dept. of Geography
#302 Techniques of Spatial Analysis: Cartography and Remote Sensing (RS)
UGrad Trips
- Univ. of Vermont*
Dept. of Civil Eng.
#210 Air Photo Interp. (PI)
3 Sem. hrs. UGrad/Grad Trips
- Dept. of Geography
#161 Remote Sensing of Environment (RS)
- #261 Remote Sensing and Environmental Problems (RS)
- VIRGINIA
Emory and Henry College-Emory
Dept. of Geology
Cartography and Remote Sensing (PI)
4 Sem. hrs. Trips
- Virginia Military Institute*
Dept. of Civil Eng.
#450 Photogrammetry (PG)
2 Sem. hrs. UGrad Trips
- WASHINGTON
Univ. of Washington
Dept. of Civil Eng.
#316 Geometronics (PG)
4 Sem. hrs.
- #415 Photogrammetry (PG)
3 Sem. hrs.
- #515 Stereogrammetry (PG)
3 Sem. hrs.
- #518 Aerial Triangulation (PG)
3 Sem. hrs.
- #530 Adjustment Computations (PG)
4 Sem. hrs.
- #565 Remote Sensing of Environment (RS)
3 Sem. hrs. Grad Trips
- Dept. of Geological Sciences
#414 Photogeology
3 Hrs. UGrad/Grad
- Dept. of Urban Planning
#508 Specialized Planning Laboratory in Remote Sensing Applications (RS)
5 Hrs. Grad Trips
- Washington State Univ.*
Dept. of Agronomy and Soils
#416 Airphoto Interp. (PI)
UGrad/Grad
- WEST VIRGINIA
West Virginia Univ.
Dept. of Civil Eng.
#307 Photogrammetry (PG)
3 Sem. hrs. UGrad/Grad
- #485 Airphoto Interp. (PI)
3 Sem. hrs. UGrad/Grad
- Division of Forestry
#226 Remote Sensing of the Environment (RS)
2 Sem. hrs. UGrad Trips
- WISCONSIN
Univ. of Wisconsin-Eau Claire Dept. of Geography
Remote Sensing of Environment (RS)
- Univ. of Wisconsin-Madison*
Depts. of Civil* and Environmental Eng.
#355 Adjustment Computations (PG)
3 Sem. hrs.
- #356 Photogrammetry (PG)
3 Sem. hrs. Trips

#550 Photogrammetry for Non-Engineers (PG) 3 Sem. hrs. Trips	<i>Univ. of Wisconsin-Milwaukee</i> Dept. of Geological Sciences Remote Sensing of the Environment (RS)
#551 Advanced Photogrammetry (PG) 3 Sem. hrs. Trips	3 Sem. hrs. Grads
#552 Remote Sensing of Environment (RS) 3 Sem. hrs.	<i>Univ. of Wisconsin-Stevens Point</i> Dept. of Geography*-Geology #377 Air Photo Interp. (PI)
#553 Stereoscopic Plotting Instruments (PG) 3 Sem. hrs. Trips	3 Sem. hrs. UGrad #379/579 Remote Sensing of Environment (RS)
#555 Air Photo Interp. (PI) 3 Sem. hrs. UGrad/Grad	3 Sem. hrs. UGrad/Grad
#750 Analytical Photogrammetry (PG) 3 Sem. hrs.	<i>Univ. of Wisconsin-Superior</i> Dept. of Geosciences (Geography) Remote Sensing of Environment (RS)
#920 Environmental Monitoring and Data Acquisition Seminar (RSr) 1 Sem. hr. Grad	UGrad/Grad
#951 Surveying and Photogrammetry Seminar (PG) 1 Sem. hr.	<i>Univ. of Wisconsin-Whitewater</i> Dept. of Geography #475 Air Photo Interp. (PI)
Dept. of Environmental Studies/Civil* and Environmental Engineering/Landscape #556 Remote Sensing Image Interp. (RS) UGrad/Grad Trips	3 Sem. hrs. UGrad/Grad Trips #498 Problems in Cartography and Air Photography (PI)
#752, 753 Environmental Monitoring Workshop (RSr) 3 Sem. hrs. Grad Trips	2-3 Sem. hrs.
#756 Digital Processing of Remote Sensing Data (IP) Grad Trips	
Dept. of Geography #170 Maps and Air Photos (MPI) 3 Sem. hrs.	

WYOMING

<i>Univ. of Wyoming</i> Dept. of Geology #701D Remote Sensing of Environment (RS) 3 Sem. hrs. UGrad/Grad	
#852D Quantitative Techniques in Remote Sensing (RS) 4 Sem. hrs. Grad	

LIST B

REMOTE SENSING AND PHOTOGRAMMETRY AT CANADIAN UNIVERSITIES

RS—Remote Sensing	MPI—Map & Photo-Interpretation
RSr—Remote Sensing related	PGe—Photogeology
PI—Photo-Interpretation	AG—Astrogeology
PIr—Photo-Interpretation related	SD—Systems Design
PG—Photogrammetry	IP—Image Processing
PGr—Photogrammetry related	OP—Optics
<i>Univ. of Alberta</i> (Edmonton, Alberta) Dept. of Geography #501 Remote Sensing and Photointerp. (RS) Grad Trips	Dept. of Forestry #442 Photointerp. of Forest Lnads (PI) UGrad/Grad #443 Remote Sensing in Forestry (RS) UGrad/Grad #543 Selected Topics in Remote Sensing: Seminar (RS) Grad Trips
<i>Univ. of British Columbia</i> (Vancouver, B.C.) Dept. of Civil Eng. #453 Photogrammetry (PG) 3 Sem. hrs. UGrad Trips #576 Civil Eng. Uses of Air Photographs (PI) 3 Sem. hrs. Grad Trips	<i>Univ. of Guelph</i> (Guelph, Ontario) Dept. of Land Resource Science #46-250 Remote Sensing (RS) 3 Sem. hrs. UGrad Trips

McMaster Univ.

(Hamilton, Ontario)

Dept. of Geography

Remote Sensing and its Geographical Applications (RS)

1 Sem. hr. UGrad/Grad Integrated Aerial Surveys (Inter-university course) (PI)

2 Sem. hrs. Grad Trips #6V3 Remote Sensing (RS)

1 Sem. hr. Grad Trips #4V3 Remote Sensing II (RS)

1 Sem. hr. UGrad Trips #3V3 Remote Sensing I (RS)

1 Sem. hr. UGrad

Memorial Univ. of Newfoundland

(St. Johns, NFLD.)

Dept. of Eng.

Remote Sensing (RS)

1 Sem. hr. UGrad

Univ. of Toronto-Erindale College

(Mississauga, Ontario)

Dept. of Survey Science

#220E Photogrammetry (PG)

6 Sem. hrs. UGrad Trips Evening

Dept. of Geography

#373 Remote Sensing of Environment (RS)

8 Sem. hrs. UGrad/Grad

Univ. of New Brunswick

(Frederickton, N.B.)

Dept. of Surveying Eng.

#2301 Analogue Photogrammetry (PG)

4 Sem. hrs. #3312 Analytical Photogrammetry (PG)

4 Sem. hrs. #4321 Aerotriangulation (PG)

4 Sem. hrs. #4342 Remote Sensing (RS)

3 Sem. hrs. #6502 Special Studies In

Photogrammetry (PG)

3 Sem. hrs. #6512 Automation in

Photogrammetry (PG)

3 Sem. hrs. #6521 Remote Sensing (RS) 2 Sem.

hrs. #6532 Engineering Applications of

Photogrammetry (PG)

3 Sem. hrs. #6711 Sensors in Geodesy and

Photogrammetry (PGr)

3 Sem. hrs.

Dept. of Forestry

Topography and Photo-Interp. for Engineers (RS)

2 Sem. hrs.

Univ. of Winnipeg

(Winnipeg, Manitoba)

Dept. of Geography

#4302-5 Remote Sensing (RS)

1 Sem. hr. UGrad Trips

Sir Sanford Fleming College

(Lindsay, Ontario)

Dept. of Natural Resources

Photogrammetry (PG)

3-6 Sem. hrs.

Photointerp. (PI)

3 Sem. hrs.

Photointerp. II (PI)

4 Sem. hrs.

Remote Sensing (RS)

4 Sem. hrs.

Ryerson Polytechnical Institute

(Toronto, Ontario)

Dept. of Civil Technology

(Geodetic Science)

Remote Sensing Systems and Techniques (RS)

4 Sem. hrs. UGrad Trips

Remote Sensing Applications (RS)

4 Sem. hrs. UGrad Trips

Univ. of Ottawa

(Ottawa, Ontario)

Dept. of Geography and Regional Planning

#4503 Photointerp. Et Inventaire Des Ressources (PI)

1 Sem. hr. UGrad Trips

#5516 Teledetection de L'environnement (RS)

Grad

#2503 Formes de Relief, Lecture de Carte et Photointerp. (MPI)

Grad

Laval Univ.

(Quebec, P.Q.)

Dept. of Photogrammetry

#14293 Intro. to Photogrammetry (PG)

6 Trimester hrs. UGrad

#14297 Intro. to Remote Sensing and Image Interp. (RS)

3 Trimester hrs. UGrad

#14294 Basic Photogrammetry I (PG)

9 Trimester hrs. UGrad

#14295 Basic Photogrammetry II (PG)

9 Trimester hrs. UGrad

#14296 Intro. to Aerial Triangulation (PG)

9 Trimester hrs. UGrad

#11367 Forestry Photo-Interp. (PI)

3 Trimester hrs. UGrad

#11368 Forestry Photogrammetry (PG)

6 Trimester hrs. UGrad

#11369 Photo-Interp: Recreational Areas, Hydrology, Fauna (PI)

6 Trimester hrs. UGrad

#13228 Photo-Interp: Urban Areas (PI)

6 Trimester hrs. UGrad

Terrestrial Photogrammetry (PG)

6 Trimester hrs. UGrad

Orthophotography (PG)

3 Trimester hrs. Grad

#60615 Resources Remote Sensing and Photointerp. (RS)

6 Trimester hrs. Grad

#60616 Stereophotogrammetry I (PG)

6 Trimester hrs. Grad

#60617 Stereophotogrammetry II (PG)

9 Trimester hrs. Grad

#60618 Aerial Triangulation	(PG)	Forest Resources Image Interp. and Cartography	(PI)
9 Trimester hrs. Grad		6 Trimester hrs. Grad	
#61191 Analytical Photogrammetry	(PG)	Remote Sensing Data Acquisition Technologies	(RS)
6 Trimester hrs. Grad		6 Trimester hrs. Grad	
#61564 Forestry Photogrammetry	(PG)	Remote Sensors	(RS)
3 Trimester hrs. Grad		6 Trimester hrs. Grad	
#60620,21 Photogrammetry Seminars	(PG)	Photogrammetric Project Planning	(PG)
4 Credit hrs. Grad		9 Trimester hrs. Grad	
#60622,23 Interp. Seminars	(RS)	Resources Remote Sensing Project Planning	(RS)
4 Credit hrs. Grad		9 Trimester hrs. Grad	
#62059,60,61,62 Special Subjects in Photogrammetry (Including Field Work, Automated Photogrammetry and Cartography)	(PG)	Non-Topographical Photogrammetry	(PG)
3-12 Trimester hrs. Grad		3 Trimester hrs. Grad	
Numerical Treatment of Remote Sensing Data	(RS)		
9 Trimester hrs. Grad			
Remote Sensing Application in Limnography	(RS)		
6 Trimester hrs. Grad			

Univ. of Manitoba
 (Winnipeg, Manitoba)
 Dept. of Geography
 Remote Sensing and Its Geographical Applications (RS)
 1 Hr. UGrad/Grad

LIST C

REMOTE SENSING/PHOTOGRAMMETRY PROGRAMS IN THE UNITED STATES

Legend

- | | |
|----------------------------------|--------------------------------|
| RS—Remote Sensing | MPI—Map & Photo-Interpretation |
| RSr—Remote Sensing related | PGe—Photogeology |
| PI—Photo-Interpretation | AG—Astrogeology |
| PIr—Photo-Interpretation related | SD—Systems Design |
| PG—Photogrammetry | IP—Image Processing |
| PGr—Photogrammetry related | OP—Optics |

Eastern States

- | | |
|---|--|
| (1) Brown University—Providence, Rhode Island
M.S., Ph. D. in Planetary Geology
B.S. in geology w/emphasis on planetary geology | Minors in remote sensing and photogrammetry |
| (2) Clemson University—Clemson, South Carolina
Dept. of Civil Eng.
Minors in remote sensing and photogrammetry | (6) Mississippi State University—Mississippi State, Mississippi
Dept. of Geography
B.A., M. S. in Geography w/emphasis on remote sensing |
| (3) Cornell University—Ithaca, New York
School of the Civil and Environmental Eng.
M.S., Ph. D in airphoto studies (P.I.) and remote sensing
M.S., Ph. D. in geodetic and photogrammetric eng. | (7) University of Miami—Coral Gables, Florida
Dept. of Mechanical Eng.
Minor and Ph. D. in remote sensing |
| (4) Columbia University—New York, New York
Dept. of Geography
M.A., Ph. D. in remote sensing w/emphasis on Geography | (8) State University of New York—Albany, New York
Dept. of Geography
B.A., M.A. in Geography w/emphasis on remote sensing |
| (5) University of Delaware—Newark, Delaware
Dept. of Marine Studies
M.S., Ph. D. in remote sensing of coastal environments | (9) State University of New York—Syracuse, New York
College of Environmental Science and Forestry
Minor, B.S., M.S., Ph. D. in remote sensing
Minor, B.S., Ph. D. in photogrammetry |
| | (10) Pennsylvania State University—Erie, Pennsylvania
Depts. of Agronomy, Civil Eng., |

Electrical Eng., Forestry, Geosciences,
and Plant Pathology
M.S., Ph. d. in the above disciplines
w/emphasis on remote sensing

- (11) University of Tennessee Space
Institute—Tullahoma, Tennessee
Dept. of Eng. Science
M.S. in remote sensing
Ph. D. in remote sensing planned
Ph. D. in planning w/emphasis on
remote sensing
- (12) Washington Technical
Institute—Washington, D.C.
Dept. of Geoscience
Minor in remote sensing planned

Central States

- (1) Stephen F. Austin State
University—Nacodoches, Texas
School of Forestry
M.S., D.F. & Ph. D. in remote
sensing
M.S., Ph. D. in photogrammetry
- (2) Colorado State University—Fort Collins,
Colorado
Specialization in remote sensing
applied to natural resource,
environmental, or engineering
problems.
- (3) University of
Illinois—Urbana—Champaign, Illinois
Dept. of Geography
Minor in remote sensing
Dept. of Civil Eng.
Minor, B.S., M.S., Ph. D. in
photogrammetry
- (4) University of Iowa—Iowa City, Iowa
Dept. of Geology
Ph. D. in remote sensing
- (5) University of Kansas, Lawrence, Kansas
Dept. of Geology
M.A., M.S., Ph. D. in Geology
w/emphasis on remote sensing
- (6) University of Michigan at Ann
Arbor—Ann Arbor, Michigan
School of Graduate Studies
M.S. in remote sensing
- (7) University of Michigan at Flint—Flint,
Michigan
Dept. of Physical Geography
Plans minor in "Graphics"—includes
remote sensing and photogrammetry
- (8) Michigan State University—East Lansing,
Michigan
—Possibility of interdepartmental
(Geography, Urban Planning and
Landscape Architecture, Resource
Development) minor in remote
sensing
- (9) Missouri-Rolla University—Rolla, Missouri
M.S. in geology w/emphasis on
remote sensing

- (10) University of North Dakota—Grand
Forks, North Dakota
Dept. of Geography
B.A., B.S. in Geography w/emphasis
on remote sensing
Minor in remote sensing
- (11) Ohio State University—Columbus, Ohio
Dept. of Geodetic Science
Minor in remote sensing
Minor, B.S., Ph. D. in
photogrammetry
- (12) Purdue University—West Lafayette,
Indiana
Depts. of Civil Eng. Forestry and
Geosciences
M.S., Ph. D. in remote sensing
Dept. of Civil Eng.
Minor in remote sensing
Minor, B.S., M.S. in photogrammetry
- (13) University of Texas at Austin—Austin,
Texas
Dept. of Geography
Degrees in Geography w/emphasis
on remote sensing
- (14) University of Wisconsin at
Madison—Madison, Wisconsin
Dept. of Civil Eng.
M.S., Ph. D. in remote sensing
- (15) University of Wisconsin at Stevens
Point—Stevens Point, Wisconsin
Dept. of Geography
B.S. in Geography w/emphasis on
remote sensing
- (16) Wright State University—Dayton, Ohio
Interdepartmental degree program in
remote sensing planned

Western States

- (1) University of Arizona—Tucson, Arizona
Committee on Remote Sensing
Minor in remote sensing
- (2) University of California at
Berkeley—Berkeley, California
Dept. of Civil Eng.
M.S., Ph. D. in photogrammetry and
surveying
M.E., Ph. D. in engineering in
photogrammetry and surveying
- (3) University of California at Los
Angeles—Los Angeles, California
Dept. of Geography
B.A., M.A., Ph. D. in Geography
w/emphasis on remote sensing
Minor in remote sensing
- (4) California State University at
Fresno—Fresno, California
Dept. of Civil Eng.
B.S. in photogrammetry and surveying
- (5) University of Hawaii at Manoa—Manoa,
Hawaii
Dept. of Civil Eng.
Minor in photogrammetry

- (6) University of Idaho—Moscow, Idaho
 College of Forestry, Wildlife in Range Sciences
 M.A., M.S., Ph. D. in Forestry w/emphasis on remote sensing
 Dept. of Geology
 Minor in Astrogeology
- (7) Northern Arizona University—Flagstaff, Arizona
 Dept. of Geography
 Minor in remote sensing
- (8) University of Northern Colorado—Greeley,
 Dept. of Geology—Dept. of Astronomy
 Minor in Astrogeology
- (9) Pomona College—Claremont, California
 Dept. of Geology—Dept. of Astronomy
 Minor in Astrogeology
- (10) University of Washington—Seattle, Washington
 Dept. of Civil Eng.
 Minors in remote sensing and photogrammetry—Remote sensing is being expanded to constitute an area of specialization in “regional environmental planning.”

LIST D

REMOTE SENSING PROGRAMS IN CANADA

- Univ. of Toronto-Erindale (Toronto, Ont)
 Dept. of Eng.
 B.S. in Survey Science (includes photogrammetry and remote sensing), M.S. and Ph. D. in Eng. (may include photogrammetry and remote sensing)
- Universite Laval (Ste-Foy Que)
 Dept. of Photogrammetry
 M.S. and Ph. D. in photogrammetry
- Univ. of British Columbia (Vancouver, B.C.)
 Dept. of Civil Eng.
 B.S., M.S., M.A., and Sc. in photogrammetry
- McMaster Univ. (Hamilton)
 Dept. of Geography
 M.S., and Ph. D. in geography w/emphasis on remote sensing
- Univ. of Ottawa (Ottawa Ont)
 Dept. of Geography and Regional Planning
 Plans for major in remote sensing and cartography
- Univ. of New Brunswick (Fredericton, NB)
 Dept. of Surveying Eng.
 B. Sc. E. in Surveying Engineering (includes photogrammetry and remote sensing)

LIST E

THE OHIO STATE UNIVERSITY DEPARTMENT OF GEODETIC SCIENCE MASTER'S DEGREE PROGRAM (PHOTOGRAMMETRY) BY THESIS

Qtr	Geodetic Science Course No.	Name of Course	Credit Hours
Autumn	508	Fundamentals of Geodetic Surveying	5
	505	Photogrammetry and Photointerpretation	4
	645	Applied Math Methods, G.S. I.	3
Winter	650	Adjustment Computations I	3
	646	Applied Math Methods, G.S. II	3
	660	Geometric Photogrammetry	3
	664	Geodetic Astronomy	3
Spring	613	Electives Introduction to Advanced Geodesy	5
	636	Mathematical Cartography	4
	778	Analog Photogrammetry	5

LIST E continued

Qtr	Geodetic Science Course No.	Name of Course	Credit Hours
Summer	998	Thesis	
		Field Courses	
		Math Requirement	10*
Autumn	637	Introduction to Advanced Cartography	5
	779	Computational Photogrammetry	4

* Math. At least 10 hours of graduate level mathematics, which may include that taken in Geodetic Science 645 and 646, are required. This requirement may be fulfilled any quarter.

LIST F

TEXT BOOKS IN REMOTE SENSING AND PHOTOGRAMMETRY

REMOTE SENSING

- Interpretation of Aerial Photographs*, 2nd Ed., T. E. Avery (1968), Burgess Publishing Co., Minneapolis, Minn. 342 p. \$13.95
- Remote Sensing: A Better View*, R.D. Rudd, (1974), Dusbury Press, North Scituate, Mass. 135 p. \$5.95
- Remote Sensing in Ecology*, P.L. Johnson (1969), Univ. of Georgia Press, Athens, Georgia \$8.00
- Remote Sensing as a Planning Tool—Kodak Seminar*, Minochet et al. (1974), Kodak Publication No. M-128, Rochester, N.Y.
- Vision through the Atmosphere* W.E. Knowles, Middleton, (1968), Univ. of Toronto Press, Toronto, Ontario
- Electromagnetic Remote Sensing*, Robert Reeves, (1968), American Geological Institute November \$10.00
- Fundamentals of Electromagnetic Remote Sensing*, Thomas Lillesand, (1976), State Univ. of New York, College of Environmental Science and Forestry, Syracuse, N.Y.
- An Introduction to Remote Sensing for Environmental Monitoring*, James P. Scherz, and Alan R. Stevens, Dept. of Civil Engineering, Univ. of Wisconsin Remote Sensing Program Report No. 1
- Laboratory Manual for study of Remote Sensing*, Keenan Lee, (1976), Colorado School of Mines, Golden, Colo. 80401 255 p. \$6.00
- Remote Sensing: Techniques for Environmental Analysis*, J.E. Estes, and L.W. Senger, (1974), Hamilton Publishing Co., Santa Barbara, Calif. 339 p. \$12.95
- The Surveillance Science: Remote Sensing of the Environment*, R.L. Holz, (ed.), (1973), Houghton Mifflin Co., Boston, 390 p., 20 color figures \$8.95
- Remote Sensing with Special Reference to Agriculture and Forestry*, Committee on Remote Sensing for Agricultural Purposes (1970), National Academy of Science 2101 Constitution Avenue, Washington, D.C. 20418 424 p. \$12.95
- Remote Sensing for Planners*, Frank V. Westerlund, (1972)
- Radar Remote Sensing for Geoscientists* (Short Course Notes), L.F. Dellwig, A.J. Lewis, A.C. MacDonald, and W.P. Waite, (1972), Univ. of Kansas, Center for Research
- Remote Sensing of the Environment—a two-week short course*, K.A. Shapiro (1968)
- Radiant Energy in Relation to Forests*, Lull and Reifsyner (1965)
- Manual of Remote Sensing*, American Society of Photogrammetry (1975), 105 N. Virginia Ave., Falls Church, Va 22046. 2 Vol., \$22.50 (for students)

PHOTO-INTERPRETATION

- Aerogeology*, H.F. von Bandat, Gulf Publishing Co., Houston, Texas
- Aerial Photography Interpretation*, Donald R. Lueder, (1959), McGraw-Hill Book Co., Inc., New York 462 p. \$29.95
- Photogeology*, V.C. Miller, (1961), McGraw-Hill Book Co., Inc. 247 p. \$19.00
- City Planning and Aerial Information*, Melville C. Branch, (1971), Harvard University Press, Cambridge, Mass 283 p.
- Photogrammetry and Photointerpretation*, Stephen H. Spurr, (1960) Ronald Press \$13.50
- An Introduction to Aerial Photography for Natural Resource Management* David P. Paine (1975) Oregon State University, Corvallis, Oregon \$7.95
- The Physical Aspects of Aerial Photography* G.C. Brock, (1967), Dover Publications, New York
- Aerial-Photo Interpretation in Classifying and Mapping Soils* (Ag Handbook 294), Soil Conservation Service (1966), SCS, Department of Agriculture, Washington, D.C. 89 p. (\$0.75)
- Manual of Photographic Interpretation* American Society of Photogrammetry (1960), Banta Publishing Company, Menasha, Wisconsin 868 p. (Out of print)

- Aerial Photographs in Geologic Interpretation and Mapping* (USGS Prof. Paper 373) R.G. Ray, (1960), U.S. Government Printing Office, Washington, D.C. 230 p. (\$5.25)
- Air Discovery Manual*, C.H. Strandberg, (1967), John Wiley and Sons, Inc., N.Y. 249 p. \$18.50
- Terrain Analysis: A Guide to Site Selection Using Aerial Photographic Interpretation* (Community Development Series), D.W. Way, (1973), Dowden, Hutchinson & Ross, Inc., Stroudsburg, Pa. 392 p. \$29.50
- Aerial Photo Ecology* John A. Howard, (1970?) American Elsevier Publishing Co., Inc. \$18.00 (out of print)
- Aerial Photographs in Field Geology*, L.H. Lattman, and R.G. Ray, (1965), Holt, Rinehart & Winston, New York City, N.Y. \$6.00
- Forecasting Trafficability of Soils—Airphoto Approach*, R.D. Miles, A.A. Rula, and W.W. Grabau, Tech. Memo 3-331, Report 6, Waterways Experiment Station Corps. of Engineers, (1963)
- Manual of Color Aerial Photography*, American Society of Photogrammetry (1968), Banta Publishing Company, Menasha, Wisconsin, 550 p. (\$24.50)
- Air Photo Interpretation for Land Planning*, Douglas Way, (1968), Harvard University Press, Cambridge, Mass 137 p. \$5.00
- Airphoto Interpretation of Soils and Rocks*, S.J.G. Bird, P. Eng. (adapted from Forecasting Trafficability of Soils—Airphoto Approach TM 3-331 Report 6, Vol. I & II, U.S. Army Corps of Engineers)
- Air Photo Analysis and Interpretation*, J.D. Mollard (1960), Bellhaven House Ltd., Scarborough, Ontario
- La Photo Aérienne, Son Interpretation Dans Les Etudes De L'Environnement Et L'Amenagement Du Territoire*, Hugues Gagnon, Editions HRW, Montreal, Toronto \$16.50
- ASTROGEOLOGY**
- Geology of the Moon. A Stratigraphic View*, T.A. Mutch, (1970), Princeton Univ. Press, Princeton, N.J. \$17.50
- Primer in Lunar Geology*, R. Greeley, and P. Schultz (1974) NASA-AMES
- Exploration of the Universe*, G. Abell, (1975), Holt, Rinehart & Winston \$15.00
- Planetary Geology* Nicholas M. Short, (1975), Prentice-Hall Inc., Englewood Cliffs, N.Y. \$17.95
- Moon and Planets*, William K. Hartmann, (1972), Wadsworth Publishing Co. \$13.95
- PHOTOGRAMMETRY**
- Photogrammetry*, Francis H. Moffitt, (1967), International Textbook Company, Scranton, Penn. \$15.50
- Simple Photogrammetry*, J.C. Williams, (1969), Academic Press \$9.50
- Phototriangulation*, Sanjib K. Ghosh, (1975), Lexington Books \$22.50
- Photogrammetry Kit*, Eichler & Tubis
- Outline of Photogrammetry*, K. Schwidewsky, (1959), Pitman Publishing Corp., 20 East 46th Street, New York, N.Y. 10017
- Elements of Photogrammetry*, Paul R. Wolf, (1974), McGraw-Hill Book Company \$19.50, Solutions manual \$2.50
- Theory of Stereophotogrammetry*, Sanjib K. Ghosh, (1968), Ohio State University Press (1968)
- Manual of Photogrammetry*, American Society of Photogrammetry, (1966), Banta Publishing Company, Menasha, Wisconsin 1220 p. 2 vol. \$22.50
- Photogrammetry*, B. Hillert (1960), McGraw-Hill Book Company, 330 West 42nd Street, New York, N.Y. 10036 \$23.75
- Basic Metrical Photogrammetry*, Duane Lyor. (1959), 896 Queen Ann Place, Glendale, Missouri
- ATLASES**
- Aerial Stereo Photographs*, H.R. Wanless, (1965), Hubbard Scientific Co., Northbrook, Ill., 92 p. \$3.95
- Stereo Atlas*, American Geological Institute (1968), Falls Church, Va.
- MAP AND PHOTO-INTERPRETATION**
- Topographic Map and Air Photo Interpretation*, Emile D. Chevrier, and D.S.W. Aitkens, (1970), McMillan Co. of Canada \$6.50
- Radar Fundamentals*, Gershan J. Wheeler, (1967) Prentice-Hall, Inc. \$11.95
- Infrared Radiation*, Juan Simon, (1966), Van Nos Reinhold \$3.95
- Handbook of Military Infrared Technology*, W.L. Wolf (1965), Office of Naval Research, Department of the Navy, Government Printing Office \$9.30
- Optical and Photographic Reconnaissance Systems*, Niels P. Jensen, (1968), John Wiley and Sons \$17.25
- Infrared System Engineering*, R.D. Hudson, (1969) John Wiley and Sons \$29.75
- IMAGE PROCESSING**
- Statistical Pattern Recognition*, Chi-Hau Chen (1973), Spartan Book, Hayden Book Co. \$17.25
- Digital Signal Processing*, Alan V. Oppenheim and Ronald W. Schaffer (1975), Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632 \$21.95
- Picture Processing by Computer*, A. Rosenfeld (1969), Academic Press, 111 Fifth Avenue, New York, N.Y. 10267 \$17.00
- Pattern Classification and Scene Analysis*, Richard O. Duda, and Peter E. Hart, John Wiley and Sons, 605 3rd Avenue, New York, N.Y. 10016 \$24.75

LIST G
 FREQUENCY OF SELECTED TEXTBOOKS ON REMOTE SENSING AND PHOTOGRAMMETRY (U.S.)

	AUTHOR	DEPARTMENT						Total	Percent with Avery	Percent without Avery
		Geography	Geology	Forestry	Engineering	Civil Engineering	Other			
Remote Sensing	Avery	24	15	13		4	4	60	39	
	Estes & Senger	17	2				3	22	14	24
	Rudd	21	2				3	26	17	28
	Holz	19	4	1		1	5	30	20	32
	Johnson					1	1	2	1	1
	NAS	4	1			2	1	8	5	5
	Minoch					1	1	1	1	1
	Westerlund						1	1	1	1
	Middleton	1						1	1	1
	Dellwig		1					1	1	1
Photo Interpretation	von Bandat	1						1	1	2
	Man, P.I.	1	2			2	1	6	5	10
	Lueder		2			1		3	3	5
	Ray	1	10			1		12	10	20
	Miller		7					7	6	12
	Strandberg	2	1			3		6	5	10
	Branch		1			2	1	4	3	7
	Way		2			6	1	9	8	15
	Spurr			1			1	3	3	5
	Howard					1		1	1	2
	Paine			1				1	1	2
	Lattman & Ray		4					4	3	7
	Brock					1		1	1	2
Miles, Rula, Grabau					1		1	1	2	
Man. Color Aerial Photo.					1		1	1	2	
Astrogeology	Mutch		1				1	2	NA	25
	Short		3					3	NA	38
	Greely & Schultz		1					1	NA	13
	Hartmann		1					1	NA	13
	Abell		1					1	NA	13
Photogrammetry	Moffitt				3	4	1	8	NA	23
	Wolf	2		1	1	11	1	16	NA	46
	Williams					1		1	NA	3
	Ghosh		1				1	1	NA	3
	Ghosh						1	1	NA	3
	Man. Photogram.	1			1	4	1	7	NA	20
Eichler & Tubis						2	2	NA	4	
Atlases	Wanless	2	1			3			NA	NA
	AGI		1			1			NA	NA
Map Photo Interp	Chevrier & Aitkens								NA	NA
Systems	Wheeler	1					1	1	NA	NA
	Jensen	1		1			2	4	NA	NA
	Simon		2				2	4	NA	NA
	Hudson		1				1	1	NA	NA
# Courses Surveyed		57	36	15	3	26	12	149	NA	NA

LIST H
 ENGINEERING RESEARCH PROJECTS IN REMOTE SENSING AND PHOTOGRAMMETRY

	Department	Topic	# Projects 1973-74/1974-75
<i>Photogrammetry Research</i>			
Univ. Illinois-Urbana Champaign	Civil Eng.	Photogrammetry & geodesy	6/6
Purdue Univ.	Civil Eng.	Surveying & photogrammetry	3/2
Iowa State Univ.	Civil Eng.	Geodesy & photogrammetry	2/2
Clemson Univ.	Civil Eng.	Photogrammetry	1/2
Univ. Wisconsin- Madison	Civil Eng.	Photogrammetry	-/-
<i>Remote Sensing Research</i>			
Univ. Arkansas	Elec. Eng.	Remote Sensing	4/2
Univ. South Alabama	Mech. Eng.	Remote Sensing	1/no reply
Colorado State Univ.	Civil Eng.	Remote Sensing	7/4
Univ. Colorado	Elec. Eng.	Remote Sensing	3/-
Univ. Miami, Fla.	Mech. Eng.	Remote Sensing	2/2
Illinois Inst. of Tech.	Elec. Eng.	Radar Meteorology	1/1
Purdue Univ.	LARS	Remote Sensing	18/20
Kansas State Univ.	Elec. Eng.	Remote Sensing	2/3
Univ. Kansas	Elec. Eng.	Medical image processing	1/1
		Remote Sensing Radiometer	5/8 4/2
		scatterometer Pattern recognition	4/5
Louisiana State Univ. and A&M College	Eng. Research	Remote Sensing data	1/1
	Mech, Aerospace & Ind. Eng.	Land-use spectral signatures	1/1
Louisiana Tech. Univ.	Elec. Eng.	Reflectivity instrumentation design	0/1
Southeastern Massachusetts Univ.		Feature selection criteria in pattern recognition	1/1
Univ. Nebraska- Lincoln-Omaha	Gen. Eng.	Remote Sensing	-/-
C.W. Post Coll. of Long Island Univ.	Industrial Eng. Science Eng.	Remote Sensing NASA-ERTS	0/- 1/no reply
Rensselaer Polytechnic Inst.	Research Group Elec. & Systems Eng.	NASA-SKYLAB Computer image processing	1/no reply 3/0
		Detailed weather photos	0/1
		Digital process techniques	5/1
		Optical signal rayleigh wave	0/1
	Mech. Eng., Aero Eng. & Mechanics	Computer graphics design	1/1
State Univ. of New York- Stony Brook	Computer Science	Image analysis	1/0
		Automated pattern recognition	0/1
Duke Univ.	Elec. Eng.	Pattern recognition	0/1
Univ. Dayton	Elec. Eng.	Image enhancement	0/2
Ohio State Univ.	Civil Eng.	Remote sensing Airphoto Interp.	1/3 1/2

	Electro- Science Lab	Remote sensing & scattering	8/5
	Comp. & Info.	Pattern recognition	1/1
	Elec. Eng.	Pattern recognition	-/-
Oklahoma State Univ. of Agri. & Applied Science	Civil Eng.	Remote sensing studies	2/3
Oregon State Univ.	Elec. Eng.	Remote sensing	4/-
Lehigh Univ.	Elec. Eng.	Pattern recognition & Communication theory	-/no reply
Penn. State Univ.	Remote Sensing (ORSER)	Remote sensing	6/5
Vanderbilt Univ.	Science Eng.	Topographic scanning	1/1
Univ. Houston	Elec. Eng.	Pattern recognition	1/-
Texas A&M Univ.	Remote Sensing (Lab)	Coastal studies	1/2
		Data Analysis	4/4
		Earth resources	11/4
		Pollution detection	0/2
		Water resources	0/2
Univ. of Virginia	Elec. Eng.	Pattern recognition	-/4
Virginia Polytechnic Inst. & State Univ.	Industrial Eng. & Operations Res.	Image quality improvement	1/1
Univ. Wisconsin- Madison	Civil & Environ. Eng.	Remote sensing	0/-

Legend

Dash (-) indicates that the number of projects cannot be determined from the information submitted to the American Society for Engineering Education.

ORSER—Office for Remote Sensing of Earth Resources, a division of the Space Science and Engineering Laboratory, Pennsylvania State University.

LARS—Laboratory for the Application of Remote Sensing, Purdue University.

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