CHANGES TO THE “ENVIRONMENT” AT ALFRED STATE COLLEGE

Arthur P. McLaughlin

Department of Civil Engineering Technology
SUNY College of Technology
Alfred, NY 14802
607-587-4681

Subject Keywords: environmental engineering

Technique Keywords: grant writing

Pedagogy Keywords: new course/program

Overview: Mr. McLaughlin used GLRC-ED program materials and ideas to upgrade the Survey Technology curriculum at Alfred State to meet A.B.E.T. certification standards and to coordinate the ST program with the new Environmental Technology created by a 1990 Alfred alumnus of the GLRC-ED program. He also wrote a short grant that obtained state of the art GIS and CAD software for his program.

Introduction

The 1992 Great Lakes Research Consortium’s Ecosystem Dynamics practicum provided particular motivation for me to pursue changes in the environmental science curriculum at Alfred State. Of particular interest are four activities that will make up the body of this report:

1. The new Environmental Technology curriculum instituted at our college,
2. Changes to the existing course in Environmental Engineering Technology,
3. Application for a grant for GIS software for environmental problem solving, and
4. Use of videos to supplement lecture materials.

Environmental Technology Curriculum

A colleague of mine, John Buckwalter, was a participant at the 1990 GLRC-ED practicum, and he has been instrumental in securing the new Environmental Technology curriculum for our campus (Appendix 1). This curriculum is offered through the School of Agriculture and Allied Health Technologies, so I don’t have firsthand knowledge of all the pitfalls and hurdles that had to be faced in obtaining authorization to offer it, but experience in my school (Engineering Technologies) suggests it was no easy task. Interested readers can obtain further information on the program by contacting Professor Buckwalter (EDITOR’S NOTE: See Professor Buckwalter’s report at this site). I was a participant in an organization meeting for the new curriculum, and worked with Professor Buckwalter's Dean, Department Chair, and other faculty from the Allied Health area. I support the premise that environmental technology transcends “turf” disputes, and in the quest to serve our students better, a new curriculum like this needs the support of the entire campus. It is hoped that eventually students from our Bachelor of Technology program in Surveying Technology will be able to take one or more courses from the Environmental Technology sequence, as part of our mission is to educate them in what is termed “minor engineering”. The lab experiences in this new curriculum could be quite beneficial.

Environmental (Engineering) Technology

The Accreditation Board for Engineering and Technology (A.B.E.T.) will visit our campus in the fall of 1993 to review our newly instituted four year program in Surveying Technology. Under the established guidelines, we cannot insert the word “Engineering” into the title (currently Environmental Technology)
until after favorable review from A.B.E.T. Part of the process requires that all course outlines be rewritten into A.B.E.T.’s model format, and I recently concluded that process (Appendix 2). A new unit on environmental impact analysis, based on my GLRC-ED practicum experience, has been added. Unfortunately, the course currently does not include a laboratory. We must demonstrate to A.B.E.T. that we include written and oral presentations, and the use of computers. In the future, I hope to add lab and field units to the course based on my practicum experiences.

GIS Software Grant

Last winter I saw an announcement in a professional magazine detailing the availability of some 100 grants worldwide for ArcCAD, ArcView, and AutoCAD software and training, the premier microcomputer-based GIS (Geographical Information System) software. Encouraged by what was learned in the practicum, and particularly by the remarks of Dr. Haynes (GLRC Lead Instructor) concerning the availability of funds to upgrade undergraduate instruction, I made application in the form of a proposal. The proposal (Appendix 3) was submitted in mid January, and I heard nothing, other than an acknowledgement that the proposal was received, until April 30th. On that date, a large package appeared on campus containing software, manuals, etc., and an offer for 50% off on a week’s training at ESRI Headquarters in Redlands, CA. I have applied for a PDQWL Grant (supported by SUNY and UUP, the faculty union) to help with the remaining expenses, and I plan to participate in the summer of 1993. Under terms of the initiative award, I’ll have to present a technical paper to a professional journal or conference. I am looking forward to the challenge.

While OSU-Map GIS software that I have used in the past was useful, I believe that training students on state of the all ArcCAD and ArcView will be more beneficial, particularly in the environmental area. I encourage those of us in primarily two-year institutions, where the emphasis is on teaching, and not research, to reach out for some “applied research” grants. It might be the only way to bring high tech to the campus.

Use of Videos

Last summer, after the practicum, I was on my way to Colorado and stopped at my alma mater, Rose-Hulman Institute of Technology. While there, I visited their bookstore, as all faculty do, looking for something newer and better. I didn’t find a text appropriate for Environmental Engineering Technology, but I did find a great lead. Referenced in an Environmental Science text was the PBS Video series “Race to Save the Planet”. I made inquiries, and found that it is still being used.

Dr. Haynes and I have discussed the possibility of getting this as a telecourse broadcast over SUNYSAT. Brockport already offers a series of telecourses (I’ve already taken two) and I think the proposal has merit. Our campus library has acquired the series, and I’ve used selected segments in my lecture course, but in the future, I’ll make it an outside viewing requirement. I think the telecourse over SUNYSAT could be of benefit to the public colleges of New York State (both Community Colleges and SUNY).

Conclusion

The GLRC-ED practicum has broadened my horizons, and has already paid dividends. I believe the mix of “hard and soft” scientists, engineers, etc. has benefited all of us in one of or more ways. Personally, I doubt I would have applied for the GIS grant without the positive attitude the practicum fostered with regard to trying to obtain grants, etc. I think the four illustrations I’ve presented herein only represent part of the benefit to me and the Alfred campus, and most importantly, to our students.
Environmental Technology is a program designed to prepare graduates for entry-level positions in a wide variety of environmental disciplines. The curriculum provides a foundation in environmental studies, chemistry, and mathematics as well as a common core of general studies in English and the social sciences. The basic core of required courses in the curriculum provides both theoretical and practical learning experiences structured to emphasize proficiency in technical skills. Environmental regulations, such as the Superfund Act and the Clean Air and Clean Water Acts, have created a need among government agencies, industries, and private consulting firms for laboratory and field technicians in a wide variety of disciplines. Emphasis is placed on field and laboratory techniques common to a wide variety of environmental subdisciplines.

Associate in Applied Science (AAS) Degree

Environmental technicians are qualified to work in wastewater treatment, soil conservation, solid waste disposal, environmental monitoring, pollutant remediation, laboratory pollutant analysis, and incinerator operation. Typical tasks performed by these technicians include collection and analysis of leachate samples at solid-waste disposal facilities; monitoring fresh-water invertebrate and fish species as indicators of water quality; surveying forests for insect damage, and monitoring pesticide application and resultant environmental impacts; operating and maintaining of solid-waste remediation equipment; and overseeing recycling and energy-recovery programs. Students successfully completing the Environmental Technology program are able to transfer to four-year colleges, if they desire, to earn a bachelor’s degree. Electives should be chosen through consultation with officials at the intended transfer institution.

Environmental Technology is a flexible program that can be designed to fit the individual interests of the student and the demands of a specific environmental sub-discipline. The student chooses from a cluster of electives which are added to the basic core courses. A careful selection of these electives, with the help of the college adviser, can prepare the student for a wide range of more focused environmental careers. For students wishing to transfer to bachelor’s degree programs in environmental science, electives can be selected that fit the specific requirements of four-year transfer institutions.

A high school diploma and successful completion of biology, chemistry, and math - Course I. An additional year of mathematics is strongly recommended.
### ENVIRONMENTAL TECHNOLOGY

Program Outline

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 1503 Fr Composition II</td>
<td>LITR 2603 Intro to Literature 3</td>
</tr>
<tr>
<td>MATH 1123 Statistics</td>
<td>MATH 1053 College Algebra/Trig 3</td>
</tr>
<tr>
<td>BIOL 2803 Environmental Science</td>
<td>AGEC 1402 Microcomputer Ap 2</td>
</tr>
<tr>
<td>BIOL 2801 Environ Science Lab</td>
<td>CHEM 2124 Chem Principles II 4</td>
</tr>
<tr>
<td>HLTH 1802 Intro to Coll Success</td>
<td>Soc Science Elective 3</td>
</tr>
<tr>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Semester</th>
<th>Fourth Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET 3003 Soc Science Elective Environmental Law</td>
<td>AGPS 3103 Env Soil Management 3</td>
</tr>
<tr>
<td>BIOL 3425 Microbiology I</td>
<td>BIOL 4324 Env Org Chemistry Microbiology 4</td>
</tr>
<tr>
<td>AGPS 1103 Soils Technical Elective</td>
<td>COMP 3703 Technical Writing 3</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

| | 3-4 |
| | 3-4 |
| | 17-18 |
| | 15-17 |

Alfred State  
SUNY College of Technology

All programs and services of the College are administered without discrimination on the basis of race, color, religion, national origin, sex, sexual orientation, age, disability, marital status, or status as a disabled veteran of the Vietnam conflict.
Appendix 2

SUNY College of Technology at Alfred
Bachelor of Technology Program in Surveying Technology
Date: 6/30/93

COURSE DESCRIPTION
CIVL 4113 - Environmental Engineering Technology
Spring Semester 1993

1993 Catalog Data: CIVL 4113 - Environmental Engineering Technology, Credits 3 A study of water sources and the treatment and the distribution of water supplies. A study of sewage characteristics, and the collection, treatment and disposal of wastewater. A study of energy and pollution as it relates to civil engineering and construction. The course provides a framework to allow the student to do research, write a report and present orally a contemporary problem or topic. Prerequisite: One (1) year of college physics or permission of instructor.

Coordinator: A. P. McLaughlin, P.E., L.S., Associate Professor and Curriculum Coordinator

Goals:
• To obtain an understanding for solving problems in both inch—pound (“American”) and Metric (SI) units.
• To gain an appreciation of environmental issues and solutions on a global as well as a local level.
• To develop an understanding of the role of environmental impact studies for development and the roles of the various review agencies.

Prerequisites by topic: (natural science applications in physics to)
1. Water supply
2. Waste disposal
3. Pollution control

Topics:
1. Basic Concepts (2 class hours)
2. Hydraulics (3 class hours)
3. Hydrology (3 class hours)
4. Water Quality (3 class hours)
5. Water Pollution (3 class hours)
6. Drinking Water Purification (3 class hours)
7. Water Distribution Systems (3 class hours)
8. Sanitary Sewer Systems (3 class hours)
9. Stormwater Control (3 class hours)
10. Wastewater Treatment and Disposal (3 class hours)
11. Solid and Hazardous Waste (2 class hours)
12. Air and Noise Pollution (2 class hours)
13. Environmental Impact Studies (3 class hours)
14. Oral and Written Reports (4 class hours)
15. Testing and Evaluation (5 class hours)

Computer usage:
1. Word Processing for Written Term Report
2. Spreadsheet for Hardy-Cross Water Distribution Network

(This is a Lecture Only Course - No Laboratories.)

Prepared by: A. P. McLaughlin
Date: May 1993 (rev.)

CIVL4113.abet
COURSE DESCRIPTION

A study of water sources, its treatment and distribution of wastewater collection, treatment, and disposal. A study of energy and pollution as it relates to civil engineering technology and construction. The course provides a framework to allow the student to do research, write a report and present orally a contemporary problem or topic.

COURSE OBJECTIVES

1. To provide the student with the fundamentals of water collection, treatment, and distribution.

2. To provide the student with the fundamentals of sewage characteristics, wastewater collection, treatment and disposal.

3. To emphasize the need of pollution control and energy conservation pertaining to the construction industry.

4. To improve the students’ ability to research a technical topic, write a report and make an oral presentation.

DIVISION OF SUBJECT MATTER

<table>
<thead>
<tr>
<th>Topic</th>
<th>Lecture Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Water Technology</td>
<td>10</td>
</tr>
<tr>
<td>B. Wastewater Technology</td>
<td>14</td>
</tr>
<tr>
<td>C. Pollution</td>
<td>5</td>
</tr>
<tr>
<td>D. Energy</td>
<td>3</td>
</tr>
<tr>
<td>E. Impact Studies</td>
<td>2</td>
</tr>
<tr>
<td>F. Research Report</td>
<td>7</td>
</tr>
<tr>
<td>G. Tests</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>45</strong></td>
</tr>
</tbody>
</table>

A. Water Technology

1. sources
   a. impoundment 1
   b. wells 1
   c. rivers, lakes 1

2. treatment
   a. impurities 1/2
   b. natural 1/2
   c. municipal plant 3

3. distribution
   a. systems
      i. gravity 1/2
      ii. pressure 1/2
b. layout  
   i. domestic 1  
   ii. fire demand 1  

B. Wastewater Technology 14  
   1. characteristics 2  
   2. collection 2  
   3. treatment 7  
   4. disposal 3  
   5. field trip to water and wastewater treatment plant  

C. Pollution 5  
   1. construction sites 1  
   2. aggregate production 1  
   3. asphalt concrete plant 2  
   4. Portland cement concrete plant 1  

D. Energy 3  
   1. construction related 1  
   2. resources - reserves 2  

E. Impact Studies 2  
   1. purpose 1  
   2. review 1  

F. Research Report 7  
   1. oral reports 7  

G. Tests 4  

   TOTALS 45 45
Appendix 3

PROPOSAL

GEODYSSSEY ENVIRONMENTAL GIS RESEARCH GRANTS INITIATIVE

by

ARTHUR P. McLAUGHLIN, P.E.,L.S.
ASSOCIATE PROFESSOR & SURVEYING TECHNOLOGY CURRICULUM COORDINATOR

State University of New York College of Technology at Alfred
Civil Engineering Technology Department, School of Engineering Technologies
Alfred, New York 14802 USA

PHONES: (Area Code 607)
587-4681 (office/answering machine)
587-4620 (dedicated Fax machine)

For Submission to:

Geodyssey Initiative
International Geographic Information Foundation (IGIF)
5410 Grosvenor Lane, Suite 210
Bethesda, MD 20814-2160

Due Date - January 5, 1993

DESCRIPTION OF PROJECT

The applicant is the instructor for two courses which can readily make use of the ArcCAD/AutoCAD system, namely in BTST 7114 - Geographic Information Systems, and CIVL 4113 - Environmental Engineering Technology. This desktop GIS would be used in teaching sound natural resource (7114) and environmental (4113) management. Heretofore, because of State funding constraints, 7114 has had to utilize OSU-Map and Mapinfo as its only dedicated laboratory software, with AutoCAD (Versions 10 and 11) along with a digitizer being adapted to a special term project. Course 4113 currently is a lecture only course. The applicant proposes to utilize the requested software to create laboratory assignments for 7114, and “show and tell” theme demonstrations for the 4113 classes, both with an environmental emphasis. The school hardware resources include projection systems so the computer can be wheeled into the classroom for such presentations. 7114 is a Fall senior course which uses the textbook “________”, while 4113 is a Spring elective using “____________”.

The applicant is a Fellow In ACSM, and a member of ASPRS, and would propose to present a paper on the application of the Geodyssey Initiative to coursework at Alfred, offering examples of tutorials. It would be planned that the Spring 1994 ACSM/ASPRS Convention, at ______________, would be the ideal venue, and necessarily the paper would appear in the Proceedings, and would be concurrently submitted to IGIF, prior to the February 15, 1994 deadline. The applicant has previously made presentations at ACSM/ASPRS Conferences. If that concept is unacceptable, the applicant would prepare a report to be submitted to either the CARTOGRAPHY AND GEOGRAPHIC INFORMATION SYSTEMS Journal of ACSM or to the ASPRS Journal.
An attachment to this proposal will detail the hardware currently available in the Department’s “Field to Finish” surveying laboratory. Additional hardware and software is planned for acquisition during the Spring of 1993, including AutoCAD Version 12. Also, the applicant has attached a list of references of people familiar with his work in the environmental, GIS, and AutoCAD arenas.

While the campus was able to offer a shortcourse on Arcinfo, hosting educators from the University of Vermont who gave a three day course at our facility, the budget constraints of the present state economy have not permitted us to acquire the software for use by our bachelor of technology students. In acquiring a grant, a foothold would be made with this cutting edge technology.

Students in the bachelor of surveying technology curriculum are already familiar with AutoCAD, having used it with other add-on software from Benchmark, and Softdesk, so getting into a GIS ArcInfo environment would be much easier with the ArcCAD linkage. (400 words to here)