

NEW STUDENT ORIENTATION CLASS
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Abstract

Nashville State Technical Community College has, over the last several years, been working with a group of colleges, called the South East Advanced Technical Education Consortium (SEATEC), in the development of case studies for use in technology programs. The case studies are designed to be used primarily as a teaching tool, integrated into already developed courses. These case studies are available at this time.

In the process of working on the cases, a question arose concerning their applicability to a course under development by NSTCC. The course being developed was to be a first semester course which was to provide orientation to students enrolled in both AAS and AS programs, encompassing a wide spectrum of engineering/engineering technology fields. Nashville State Technical Community College has had courses of this type for the last 30 years, but the courses were specific to a degree program. While each of these courses tried to address such factors as computer familiarization, use of computer utility programs, use of the internet, teamwork, and concepts in problem solving, they varied tremendously in the instructional strategies that used and the overall effectiveness of the courses.

Nashville State Technical Community College has now developed a “New Student Orientation” Course. The course was specifically designed to incorporate all of the computer usage skills which a student would need to function in a current world environment; to learn through application “teamwork”; to develop skills in trouble-shooting and problem solving; to communicate effectively in both written and oral reports; to experience an overview of the various fields within engineering and engineering technology; and to do all of through the innovative and fun case study process. Furthermore, the case study chosen for the course addresses a problem that every student will encounter during his/her lifetime, generating a rich set of reference materials for that eventuality.

Nashville State Technical Community College proposes to present to the ASEE conference this course in detail. A description of the process and content follows.

Background

This paper is being presented to the ASEE conference attendees as a way of introducing an orientation course to the educational community. The course is designed to use the case study approach and to be “general” enough in content to service several technology degree programs. The National Science Foundation has provided funding for projects which generate industrial case studies to be used in higher education. Nashville State Technical Community College has had the opportunity to be involved in several of these projects, and has developed quite an expertise in the field of “case studies”. It seemed logical that the college needed an orientation class for students in the engineering technology arena and case studies would be the choice for

the teaching method. This paper will explain one technique which Nashville State Technical Community College believes will satisfy the need for an orientation class suitable for several engineering technology degree fields.

History

Nashville State Technical Community College began life as the Nashville State Technical Institute in the late 1960's. The degree fields were dictated by the local area needs at that time and included several engineering technology fields of study. The specific degree fields were: Industrial Engineering Technology, Mechanical Engineering Technology, Civil Engineering Technology, Electrical Engineering Technology, Electronic Engineering Technology, Architectural Engineering Technology, and Automation Robotics. These degree areas were submitted to TAC of ABET for accreditation and were in fact accredited.

Over time, the educational needs of the local community changed. The Institute saw these changes occurring and attempted to respond. Initially the response was by changing and upgrading their courses and respective course contents. Gradually, at the request of industry, the actual degree was changed. At Nashville Tech a good example of this was the combining of the Mechanical Engineering Technology, Industrial Engineering Technology, and Automation Robotics curriculum into the Manufacturing Technology Degree Program. Currently, all engineering technology programs at the college are under review, due to low enrollment, with the prospect of further combining of the programs being a real possibility.

Initially all of the degree programs had their own respective orientation classes. These classes had real merit in that they were quite focused, and allowed the individual programs to provide training within these courses in subjects which the students would later need. These courses did, however, have some shortfalls in areas which today are becoming more and more important. For example, a general overview of the entire engineering technology area was not typically included. Emphasis on teamwork, cultural diversity, written and oral presentation techniques, and the use of the computer was also not included. The need to instill in the student the ability to do troubleshooting was recognized but also not specifically included.

With all of this as a background, and recognizing the need for more of a common core approach to all engineering technology programs, Nashville State Technical Community College accepted the challenge to design an orientation class which would include the above concepts. The first step was to bring together individuals from all of the programs to identify their respective program baseline needs. Computer utility programs skills were needed by all programs, Microsoft Office. Several other subjects also were common in the program needs. Once these needs were identified, assistance was requested for the design of the working case study and release time awarded accordingly.

Developmental work was completed during the Fall Semester of 2002, with the intention that testing the course would occur during the spring semester of 2003. A case study approach was selected as the teaching strategy to be used in this course and specifically a problem based case study was the desired method. The first question to be answered then was not how the course was

to be structured but rather what should be the content of the case study.

The general opinion was that a single case needed to be completed by the students covering the entire semester, but that the case had to be big enough in scope to allow the students to experience most of the fields of engineering technology as they completed the solution for the case. The use of computers, the verbal/written skill component, concepts in practical teamwork, and the development of troubleshooting skills all had to be integral to the case. Finally the case had to be universal enough and interesting enough to gain and maintain the interest of the students as they progressed through the case.

The proposed solution to all of this was a case study in home building. The idea was that nearly everyone will at some time in their lives build their own home. At the very least everyone will know some who has built their own home, who could then serve as a resource to the student. This case is very broad in concept, and could involve every engineering technology program, with the exception of manufacturing. Several proposals were actually advanced as to how to include manufacturing; however most of them were a beyond the scope of the course. However, this case could be used in the manufacturing degree program with the appropriate adjustments to the concepts that are needed by the manufacturing degree students. Therefore the case study in building of the dream home was advanced and work was completed on this project during the spring of 2002. The actual situation in the case study was that of a staff member in the construction of his home. Many of the parameters provided to the students as a part of the case was from this construction.

The Case

The development team for this project actually viewed this project as two separate items: development of a specific problem based case study which would act as a framework for educational concepts, and the course itself which would be composed of both the case and the materials taught. As the case evolved it became obvious that the course would have to be team-taught because the teaching staff did not possess the skills as individuals necessary to address the breadth of materials embedded in the course.

This then presented a staffing problem. The approach taken in teaching a case study class is in itself innovative for most teaching environments at the college level. As a result, the staff would need some specialized training in order to actually deal with this class. With all of the challenges associated with this class, however, experience has taught that a class of this type is very worthwhile and is highly motivating for both the students and the professors.

The curriculum for this course is outlined below. It is designed for 2 hours of lecture, 2 hours of lab and 3 hours of credit.

| Week | Subject |
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| 1 | Introduction to Engineering Technology—Lecture Computer Orientation --- Lab |

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| 2 | Introduction to case study techniques- to include the cycle for case studies--- Computer Orientation--- | Lecture Lab |
| 3. | Introduction of case study/ team assignment--- Computer internet lab. --- | Lecture Lab |
| 4. | Drafting Fundamentals--- Drafting Lab--- | Lecture Lab |
| 5. | Surveying Lecture--- Surveying lab/ Drafting lab --- | Lecture Lab |
| 6. | Site Preparation--- Surveying Lab/ Drafting Lab --- | Lecture Lab |
| 7. | Architectural concepts --- Computer lab --- | Lecture Lab |
| 8. | Mid- Term Reports --- Computer lab --- | Lecture Lab |
| 9. | Electricity/ Electronics--- Electricity lab--- | Lecture Lab |
| 10. | Home Security Systems--- PLC lab --- | Lecture Lab |
| 11. | Mechanical Feature of the home--- Mechanical Lab--- | Lecture Lab |
| 12 . | Computers in the Home--- Wiring Lab--- | Lecture Lab |
| 13. | Team Work Session--- Com puter Lab--- | Lecture Lab |
| 14. | Student Presentations--- Open Lab--- | Lecture Lab |
| 15. | Student Presentations --- Open lab --- | Lecture Lab |
| 16. | Peer Evaluations--- | Lecture. |

Week-by-Week Discussions

Week 1. The first meeting of this class will be devoted to an explanation of the course objectives, teaching instructional techniques, and an overview of the entire engineering technology area. The first lab will be an introduction to the computer programs which the student will need in order to complete the assigned projects in the class.

Week 2. The second week lecture will be devoted to an explanation of the case study concepts. It will include such concepts as the case files learning cycle, the flow of problem- based case studies, thinking clearly, active learning, and will carefully explain the ideas involved in the roles of teachers and students in the problem –based case study. During this class the students will be divided into teams, and will be given the actual case. The assignment for the case will be for the student team to actually investigate all the aspects for building a “dream home”. The team will be required to investigate such things as building restrictions. They will be given a plat and a location for the home, with the county of the state. All aspects of the home construction must be decided by the team with the final requirement being that the team will present a formal presentation at the end of the semester showing the actual decisions. The final grade will be assigned based on both a written report by the team and a verbal report. The verbal report will be a PowerPoint presentation by the team to the class.

Week 3. Week three will be a continuation of week 2 to allow the teams some time to fully understand the assignment, and to develop working arrangements within the teams. The lab will be a continuation of the computer lab orientation.

Week 4. Week 4 will be the beginning of the instruction of basic skills in those areas needed by the students in this class. It is recognized that a depth of instruction in this skill areas cannot be accomplished in such a short time; however some exposure can be provided. The first of these skill presentations is a lecture on drafting, since the teams will be required to show their plats with the home footprint delineated. The lab will be a practice for the drafting requirement

Week 5. Week 5 will be an introduction to surveying in the most general of terms. Since the students will be expected to have very limited math skills, the lecture must be very general. The associated laboratory will be limited as well, but will at least allow the students to touch and manipulate surveying equipment.

Week 6. Student lecture material and laboratory during this week is aimed at allowing the student to see the problems associated with site preparation. The drafting labs will permit the student to draw the actual plat to be used.

Week 7. The architectural concepts lecture will contain material directed toward understanding architectural drawings and symbols. With this as a background, the students then, as a team, will be able to use the computer to identify the house which their team desires to be built.

Week 8. This week will be devoted to reports by the teams as to their respective progress. Any unique assistance which will be needed by the teams will be identified at this time.

Weeks 9 through 12. These weeks will contain a continuation of presentation of materials needed by the teams to understand all the provisions of the home construction. It is expected that the teams will have set up meeting times to discuss their projects.

The final two weeks of the course will be used to allow the teams to present in a formal PowerPoint presentation of their respective homes.

Conclusions

Many of the problems of the design of this course had to do with departmental co-ordination. Everyone had their own desires and compromise was the order of the day. The greatest challenge appeared to be how to limit the amount of instruction provided, since this would be a first semester course and the knowledge possessed by the students would be limited.

There is still much to learn about this course; information which can only be obtained by teaching the class. There is a real need to provide the instructors some training in how to administer this type of class, since it varies from what has been the norm. The idea that the instructor will move from the position of “information provider” to “course facilitator” is new.

There have been classes which have contained case studies; however the concepts are still new to many instructors. It is a very powerful way to provide knowledge to the students in a way in which they will retain much of that knowledge, but it will involve a rethinking by both the instructors and the students.

This course then is provided as an opportunity to the educational community to enter this “brave new world”. Details on lecture content and recommended supporting laboratories will be provided as hand-outs at the ASEE conference.

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*“Proceedings of the 2003 American Society for Engineer Education Annual Conference & Exposition
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Biographies

William Maxwell is Associate Professor of Electronic Engineering Technology at Nashville State Technical Community College. He has been with the college for nineteen years and has twenty-two years of industrial experience prior to joining the college. He holds a Masters in Engineering Technology and a BS in Electrical Engineering.

James Johnson is Dean of Business and Technologies at Nashville State Technical Community College. He has extensive experience at the community college level and industry. His degrees include an Ed.D. in Education, and MS in Physics, and BS in Secondary Education. He has developed and disseminated numerous innovative programs that connect education with business.