

## **Freshman Retention in Engineering Technology Programs at Rochester Institute of Technology**

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### **Abstract**

This paper describes how the freshman seminar movement has been implemented at Rochester Institute of Technology (RIT). All seven engineering technology programs at RIT have had a required freshman seminar course in their curriculums for the past five years. Course staffing and typical session topics in these courses are described. Freshman attrition in engineering technology programs at RIT has improved from 21% in 1991 to 12% in 1994.

### **Introduction**

A decrease in freshman enrollments at RIT started in 1989 and continued to 1994 with a one year increase in 1992. The number of engineering and engineering technology degrees awarded by schools with ABET accreditation has been relatively constant since the early 1990's in the surveys conducted by the Engineering Workforce Commission of the American Association of Engineering Societies.<sup>1</sup> Engineering and engineering technology programs at Rochester Institute of Technology (RIT) are five-year programs as they require fifteen months of cooperative work experience so engineering and engineering technology degrees didn't start decreasing until 1993. Loss of tuition revenues in this five year period forced RIT to decrease department operating and capital equipment budgets, limit faculty and staff pay raises, and postpone physical plant improvements. An emphasis on increasing student enrollments began during these years and this is when the freshman seminar program was started.

Engineering technology programs at RIT responded in four different ways to increase enrollments. Site and distance learning certificate programs were added to the engineering technology programs which increased enrollments. Engineering technology programs which were originally transfer three year programs all became five year programs since transfer students were declining. The increase in freshman enrollments in 1995 began to offset the decrease in transfer enrollments. RIT developed a freshman seminar program in the Division of Student Affairs in 1989 to increase student retention. Departments were encouraged to participate but were not required to add the course to their curriculums. All of the departments in engineering technology at RIT with freshman students added freshman seminar courses to their programs. Freshman

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<sup>1</sup> LeBuffe, Claire Degrees in 1995 Holding steady " ASEE Prism April 1996 page 33-35

enrollments at RIT began increasing in 1994 and it has been found in engineering technology that the now mature freshman seminar courses are assisting new students develop techniques that aid their personal and academic success in their first year at RIT.

### **Freshman Seminar Courses**

The Freshman Seminar movement began on the campus of the University of South Carolina in 1972 and this course is now offered in many different forms at many different universities across the United States. Freshman seminar has been associated with many different outcomes and one of these outcomes is improved retention. Retention research data at the University of South Carolina has shown that freshman taking University 101, the freshman seminar course have achieved a higher sophomore return rate than nonparticipants from 1972 to 1984<sup>2</sup>. Participants in the University 101 course have frequently been less well qualified, based on Scholastic Aptitude Test (SAT) scores and high school rank. Retention has also been studied at over fifteen other campuses during this same time period and lend support to the conclusion that on the whole freshman seminars are a positive influence on retention. Three of the things that the freshman seminar class often does is improve the quality of the relationship between student and faculty, integrate freshmen into the campus social system, and introduce freshman to campus resources.

The majority of the freshman seminar courses at RIT are developed as a joint venture between Student Affairs and specific academic departments in an effort to offer support to new students. The courses developed jointly with Student Affairs use the South Carolina model. Some departments have developed their own freshman seminar courses using other models. Most courses are one quarter hour of credit and meet once a week for one and one-half hours. Some courses are co-facilitated by department faculty and Student Affairs staff; others are taught by individuals from either area. The goals are to assist the new student in developing his or her own: peer support, utilization of campus resources, connection of academic department, faculty and advisor relationships, awareness and respect of differences, self image, and skills in communications and teamwork. Freshman seminar sessions for these courses may include career information, communication, teamwork and leadership activities, drug and alcohol education, values, diversity, and ethics, study skills, personality and interest inventories, and self management of stress and social issues. The new student is provided with a direct connection to academic department, peer and mentor support from the student affairs and faculty facilitators, and an introduction to campus resources. Resources that can be introduced are the library, computer systems, and the Learning Development Center. The courses are not always restricted to freshman students. Some departments encourage new

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<sup>2</sup> Upcraft, M. Lee, Gardner, John N. and Associates, *The Freshman Year Experience* Jossey-Bass Publishers San Francisco, California 1989

students to RIT to enroll in the freshman seminar course and other departments offer courses for transfer students.

The Division of Student Affairs at RIT integrates student learning and personal development by assuming a leadership role in creating a campus environment that is an integral component of the learning process and complements the academic curriculum. Programs and services enhance the students' ability to learn and to develop the life skills necessary to become productive and caring members of our global society. The Division of Student Affairs consists of ten centers which are each responsible for a specific functional area. The ten centers are: Campus Life, Campus Ministry, Counseling, English Language Institute, Intercollegiate Athletics, Learning Development Center, Physical Education and Recreation, Residence Life, Student Health, and Student Transition and Support. The Freshman Seminar course program is provided by the Center for Student Transition and Support whose mission is to aid the academic and personal success of every student and provides models for the integration and transition of all students, especially African, Hispanic, Asian, and Native American (AHANA), international, and those new to the Institute.

### **RIT Freshman**

RIT is a private university with seven different colleges located in upstate New York. RIT has an enrollment of approximately 8,000 full-time undergraduate students and has approximately 1250 new freshman students entering each year. The largest two colleges are the College of Applied Science and Technology (CAST) and the College of Imaging Arts and Sciences (CIAS). All of the programs in the College of Business (COB), six programs in CIAS and CAST, four programs in the College of Science (COS), and three programs in the College of Engineering (COE) offer Freshman Seminar courses with the assistance of Student Affairs. Three of largest and oldest programs in CAST are computer science (CS), engineering technology (ET), and food, hotel, and travel management (FHTM) and all students in these three CAST programs participate in freshman seminar course with the assistance of Student Affairs. Engineering technology programs have been at RIT for over twenty five years. These programs were transfer programs until 1989 when lower division programs for freshman students were initiated in each department. Table #1<sup>3</sup> shows the number of freshman students in the four largest RIT colleges and three largest CAST programs that have freshman seminar programs.

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<sup>3</sup> RIT Institutional Research / RJB in a report dated October 20, 1996 titled RIT Full-Time Students attrition and Graduation Rates -by Department -Freshman: Excluding Transfers Version A: Students Leaving RIT counted as Attrition.

Table #1 RIT Freshman Students

Year	RIT	CAST	CIAS	COB	COE	CS	ET	FHTM
1987	1387	225	383	157	324	108		66
1988	1505	233	442	193	323	106		67
1989	1334	214	380	137	311	92		52
1990	1046	176	342	101	230	63	18	51
1991	1054	162	329	78	254	66	61	28
1992	1260	213	376	76	327	87	76	45
1993	1173	212	325	63	279	90	82	30
1994	1226	213	303	66	332	90	73	18
1995	1443	290	414	66	349	109	111	26
Total/5	6306	1010	1876	666	1441	435	79	264
Total/4	5092	928	1418	271	1287	431	342	119

Total/5 is the number of students from 1987 to 1991.

Total/4 is the number of students from 1991 to 1995.

### **Engineering Technology Freshman Seminar Course Sessions**

There are seven different engineering technology programs with freshman students at RIT and each program offers a Freshman Seminar credit course with assistance from the Division of Student Affairs. The undeclared engineering technology freshman students have a two credit course and the freshman in the other programs each have a one credit course in the fall quarter. Each course has twelve to twenty students and two instructors. One of the instructors is a faculty member in the department offering the course and the other instructor is a staff member in student affairs or another college division. If the freshman enrollment in one program in a department is low, it can be combined with another program in the department. In the fall of 1996 there were two freshman seminar classes for the mechanical and manufacturing engineering technology freshman and one class each for the freshman in civil, computer, electrical, and the telecommunications engineering technology programs. The computer, electrical and telecommunications engineering technology programs are all in one department so several joint sessions were held with the students from all of the programs in this department. The undeclared engineering technology freshman seminar class meets for another hour and half each week to explore the various engineering technology, information technology, and packaging science programs in the college.

Some of the common sessions in the engineering technology freshman seminar sessions are study skills, Red Barn activities, group project activities that are applicable to programs in the department, group presentations on the projects, time management, creativity, risk taking, ethics, multi-intelligence presentations, drug and alcohol presentations, global perspectives, student and alumni panels, and journal writing. Each department decides on the sessions that they want to use each year. The sessions are often

dependent upon the expertise of the faculty that are teaching the course. Departments are free to develop new sessions or incorporate new session ideas from Student Affairs. The Red Barn is a facility used by the Center for Physical Education and Recreation for activities such as rock climbing and rope activities. All activities in the Red Barn are conducted by trained facilitators and these activities are very popular with the students. Other sessions that receive good reviews are the student and alumni panel discussions.

The freshman coordinator from Division of Student Affairs at RIT works with the RIT departments to facilitate the freshman seminar classes by recruiting new instructors from student affairs and other college divisions. Student Affairs develops new sessions, provides training for the sessions and the instructors, and provides materials needed for special sessions. The coordinator generally meets with the instructors of the class before the class starts in the fall and again after the class is finished to evaluate the class.

### **Freshman Attrition**

Retention of students is an issue of interest at Rochester Institute of Technology (RIT) and the Institute maintains attrition data on entering freshman students. The Institute knows the attrition rate of freshman after one quarter (3%), two quarters (6%) and after one year (16%). Retention is also an issue in many universities as studies have shown that it is much more expensive to recruit a new student than it is to keep a current one.<sup>4</sup>

The retention data for RIT is provided for both colleges and the three largest CAST programs in Table #2<sup>5</sup>. This table shows the percentage of attrition between the freshman and sophomore years from 1987 to 1995. The AVG./5 is the average attrition percentage for 1987 to 1991 and the AVG./4 is the average attrition percentage from 1992 to 1995. Transfer students are excluded from the data and students leaving RIT are counted as attrition. The first column (year) is students entering in the fall quarter of the year. The data in all other columns is attrition % after 1 year.

Table # 2 shows that the RIT attrition rate was the lowest in 1991 (14.89 %) and the highest in 1993 (17.47%). Freshman seminar programs with the Division of student affairs were started in all of the COB programs in 1987, the Computer Science (CS) program in 1988, and in two of the larger programs in CIAS in 1989. Freshman seminar programs only existed in the computer engineering technology program in 1990. This program had started its lower division program several years before the other engineering technology programs. Freshman programs were added to all of the other engineering technology programs in 1991.

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<sup>4</sup> Ferguson, J.M. R. E. Wishner and R. Discenza, "Developing a Framework for Student Retention: A Challenge to Traditional Enrollment Approaches", NASPA Journal, vol. 24, 1987 pp. 2-9

<sup>5</sup> RIT Institutional Research / RJB in a report dated October 20, 1996 titled RIT Full-Time Students attrition and Graduation Rates -by Department -Freshman: Excluding Transfers Version A: Students Leaving RIT counted as Attrition.

Table #2 RIT Full-Time Student Freshman Attrition in Percent

Year	RIT %	CAST	CIAS	COB%	COE%	CS%	ET%	FHTM
1987	14.92	16.00	9.13	21.65	15.12	13.88		13.83
1988	16.61	18.02	14.25	15.02	17.33	28.30		8.95
1989	15.81	17.28	11.57	10.21	17.68	21.73		7.69
1990	15.77	18.75	13.15	19.80	19.13	20.83	16.66	15.68
1991	14.89	17.90	12.46	12.82	17.39	16.66	21.31	17.85
1992	14.92	16.90	15.15	14.47	15.59	20.68	14.47	13.33
1993	17.47	15.56	18.46	17.46	20.43	21.11	13.41	6.66
1994	15.41	15.02	13.53	13.63	18.67	21.11	12.32	22.22
1995	15.42	17.58	13.28	24.24	18.91	17.43	18.91	23.07
AVG/5	15.65	17.52	12.15	16.06	17.21	20.45	20.25	12.12
AVG/4	15.76	16.37	15.02	17.34	18.91	18.56	15.2	15.12

### Conclusions

Student retention rates are rapidly becoming a popular measure upon which institutional comparisons are made and their effectiveness judged.<sup>6</sup> College and departments at RIT will have productivity goals to meet in the future. Departments can become more productive by increasing their student numbers or decreasing their budgets. Departments who have an increase in students from new applicants or higher retention rates of enrolled students will not have to decrease their budgets in order to become more productive. An increase in student retention will increase college and department productivity and emphasis on student retention will continue in the future.

In engineering technology freshman attrition decreased from 21% to 12% in 1994, and then increased in 1995 to 19%. Other factors that may have influenced the 1995 attrition rate of 19% are the increase in the entering freshman students, administrative reorganization, and managed faculty and staff attrition. In 1995 all colleges and staff at RIT were in the second year of a managed attrition program implemented by the President. Only 20% of the faculty and staff that left the university during this time period were replaced. There was an increase in freshman in 1995 and RIT required three freshman to live in many dormitory rooms that normally only house two students. Student Affairs which manages the dormitory complex was operating with reduced staff in the second year of managed attrition. Next year sophomore students at RIT will not be required to live in the dormitories so only two students will be assigned to a room in the fall quarter.

<sup>6</sup> Moller-Wong, Cheryl and Eide, Arvid "An Engineering Student Retention Study", Journal of Engineering Education January 1997 pp. 7-15

It appears that many of the peaks in attrition in Table #2 occur when administrative reorganization at RIT has been implemented. The attrition rates for CAST which houses all of the engineering technology programs have decreased each year with exception of 1995. In 1995, CAST eliminated three large schools in CAST and moved all functions of the schools either down into the departments or up to the College to eliminate staff to provide funding for the new RIT strategic plan initiatives. The schools eliminated were the School of Engineering Technology, the School of Computer Science and Information Technology, and the School of Food, Hotel, and Travel Management whose programs enroll the majority of the CAST students. Table 2 shows that attrition rates in CIAS peaked in 1993 and this was the year that two colleges were combined to form the present CIAS.

The only program in CAST that has better freshman retention rates than the engineering technology programs since 1992 is the packaging science program which is a much smaller program. Nineteen students entered the program from 1987 to 1991 and the average attrition was 5.26% after one year while 35 students entered the program from 1992 to 1995 and the average attrition from these four years was 5.71%. Engineering technology programs at RIT have better retention rates than the College of Engineering programs and the College of Business since 1992. Only three programs in the College of Engineering use the freshman seminar South Carolina model that the engineering technology programs use. These engineering programs are undeclared engineering, mechanical engineering, and industrial engineering.

It cannot be stated that the freshman seminar courses are completely responsible for the decrease in attrition rates in CAST but the courses do assist faculty in the departments who advise the students in many different ways. New students who have problems with the English language, learning disabilities, or need counseling can be referred during the first quarter of classes for evaluations and corrective action can begin in the next quarter. Students have another opportunity to meet department faculty, RIT staff, and other new students. These activities facilitate earlier and more frequent student, department, and faculty contact which helps new students form study groups and use RIT resources earlier in their academic career. Evaluation of each cycle of the freshman seminar class allows faculty to improve the course the next year and implement new topics in the summer and fall orientation sessions for the freshman students.

Carol Richardson is a Professor and the Department Chair of the Department of Electrical Engineering Technology in the College of Applied Science and Technology at Rochester Institute of Technology. She graduated with a B.S.E.E. degree from the University of Wyoming in 1967 and a M.S.E.E. from Union College in 1975. She worked five years for Collins Radio Company in the Telecommunications Systems Division and five years for General Electric Company as an instrumentation and control engineer before she started teaching at RIT in 1978. She developed the first TAC/ABET accredited B.S. program in Telecommunications Engineering Technology at RIT in 1989. The other two B.S. programs in the Department of Electrical Engineering Technology at RIT are Electrical Engineering Technology and Computer Engineering Technology.