

# GROWING FIGS, LEARNING LESSONS, AND DEVELOPING ENGINEERS: A FIRST YEAR STUDENT PROGRAM

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**Abstract** *The Women in Engineering Program at The University of Texas at Austin has run four different Freshman Interest Groups (FIGs) since the fall 1998 semester. These FIGs have existed to improve the retention rate of first time in college female students studying engineering and to increase their academic success. FIGs are designed to encourage networking and to develop camaraderie among first year students while simultaneously providing a mixture of educational, developmental, and social experiences. The four FIGs have been based on varying models and have included some or all of the following aspects: weekly one-hour seminars, co-enrollment in basic sequence courses, a residential component, assorted advisors and peer mentors, and out-of-class activities. This presentation will include information on lessons learned from each model in addition to marketing and financing the program, conducting the FIG seminars, and an examination of retention data and anecdotal responses from past participants.*

**Index Terms** *first year programs, freshman, Freshman Interest Group (FIG), retention*

## THE UNIVERSITY OF TEXAS AT AUSTIN

Founded in 1883, The University of Texas at Austin serves as the academic flagship of The University of Texas System's 15 academic and health institutions. UT Austin currently enrolls almost 50,000 students, about 25 percent in graduate and professional programs. The University leads all institutions in the South in the quality of its graduate programs, as well as in the number of doctor's degrees awarded. More than 100 undergraduate degree programs and 170 graduate degree programs are offered by The University's 14 colleges and schools. The University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools.

## THE COLLEGE OF ENGINEERING

The College of Engineering at UT Austin is recognized as being among the top five public colleges of engineering in the nation. In the most recent *US News & World Report* ranking of undergraduate programs, the College was ranked twelfth, fifth among the public universities, out of several hundred ABET accredited engineering schools in the United States. The graduate program was ranked tenth in 2002

rankings. Eight of the program specialties were ranked near the top nationally. The College's 230 professorial faculty, 517 full-time and 182 part-time staff, and 1,126 teaching and research students serve over 6,600 students enrolled in eight undergraduate and 15 graduate programs.

## WOMEN IN ENGINEERING PROGRAM

The Women in Engineering Program (WEP) at The University of Texas at Austin actively works to recruit more women engineering students, to increase the percentage of women engineering graduates, and to promote a supportive environment that encourages the success of women in engineering. The goals of WEP are to increase the number of women entering the engineering career pipeline and to provide them with the skills and knowledge needed to be successful in today's engineering workforce.

Established by the College of Engineering in 1992, WEP focuses its efforts on pre-college outreach, academic support, peer and industry mentoring, student leadership, and career development initiatives. The concept of WEP was originally proposed by engineering faculty women and enthusiastically supported by the Dean of Engineering. WEP is a College-wide effort with a full time Director, two Program Coordinators, an Administrative Associate, and a committee of faculty advisors in addition to numerous paid and volunteer students and industry professionals.

WEP serves as an advocate for women students and plays a key role in providing academic enrichment and mentoring experiences that complement a student's professional development. The kinds of activities coordinated by WEP include: pre-college programs, first year programs, second year programs, tutorial assistance, peer and industry mentoring, career development events, and industry recruitment events and tours.

As of the spring 2002 semester, 22.2 percent (n = 1,051) of the undergraduate student engineering population at UT Austin are women. WEP strives to establish an environment that encourages the success of women engineers both academically and professionally. College, corporate, and foundation funds support WEP programs.

## HISTORY OF THE FIG PROGRAM AT UT AUSTIN

In fall 1998 the Division of Student Affairs at The University of Texas at Austin, in conjunction with the Colleges of Engineering, Fine Arts, Liberal Arts, and

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Natural Sciences, piloted a program of Freshman Interest Groups (FIGs). A FIG is a cohort of 20 to 25 freshmen who take three courses together the first semester of the freshman year. The courses in the FIG are loosely linked to a theme and are selected to satisfy either general education or major requirements. One of the three courses in the FIG is usually small so that students can get to know each other and recognize each other in large classes. In addition, there are weekly seminars, led by a peer advisor and/or a staff advisor, in which students are introduced to University facilities and resources and have the opportunity to interact with each other, staff advisors, and faculty.

The purpose of the program is to help first-time freshmen adjust to a large university environment by creating a small community in which students can develop social and academic connections. The FIG acquaints students to the campus via multi-dimensional experiences. Students gain a sense of belonging in two large settings: the college or school in which they are enrolled and the entire University community. The FIG program blends aspects of both academic and student affairs. There are well-established FIG programs at the University of Oregon, University of Missouri, and University of Washington.

Students self select for the FIG and enroll during registration. Once the class limit is reached, registration for the FIG is closed. The colleges involved select, manage, and advise their own FIG courses and students. The program is sponsored and coordinated by each of the Colleges and Schools and the Office of the Vice President for Student Affairs (where the FIG Office is housed).

The following tables present information based on the first year of the FIG program (fall 1998).

Comparison of FIG and NON-FIG participants by Gender		
	Male	Female
FIG	40.3%	59.7%
NON-FIG	49.4%	50.6%

Comparison of FIG and NON-FIG participants by Ethnicity				
	White	African Am.	Asian Am.	Hispanic
FIG	67.8%	3.2%	13.0%	15.2%
NON-FIG	65.0%	2.9%	17.1%	13.1%

Comparison of FIG and NON-FIG participants by Residency			
	Texas	Non-Texas	Foreign
FIG	90.1%	9.5%	0.4%
NON-FIG	93.4%	5.3%	1.3%

How well did FIG participants do after their first semester?					
		Average SAT		Cumulative GPA	
College	N	FIG	Non FIG	FIG	Non FIG
Engineering	58	1250	1282	3.37	3.07
Fine Arts	18	1174	1171	3.35	3.10
Liberal Arts	251	1176	1165	2.90	2.86
Natural Sciences	167	1195	1201	2.83	2.88
Total	494	1191	1202	3.11	2.97

After their first semester (the semester with the FIG), 93% of engineering students who participated in FIGs were enrolled in good standing, versus 87% of students who had not enrolled in a FIG. Evaluative information from the FIGs run in the College of Engineering in fall 1998 follows: 61% report 'Definitely Yes' to the question, "My mentor was helpful to me in finding assistance and resources at UT."; 58% report 'Definitely Yes' to the question, "Being in a FIG helped me feel more comfortable at UT."; 71% reported that they formed a study group with other students in their FIG.

## THE FOUR FIG MODELS FOR WOMEN IN ENGINEERING

The four FIGs (one each year for the past four years) run by the Women in Engineering Program have been based on varying models and have included some or all of the following aspects: weekly one-hour seminars, co-enrollment in basic sequence courses, a residential component, assorted advisors and peer mentors, and out-of-class activities. The seminars are coordinated by the FIG advisor and peer mentor and include educational, social, and developmental aspects.

### The Seminar

The weekly seminar has been central to the women in engineering FIGs. Topics have included a faculty panel, time management, relaxation, preparation for an engineering career fair, career development workshop, introduction to engineering research, and many others. A survey administered to the students at the first meeting aids in topic selection, though some sessions are pre-set. Some seminar meetings are held as out-of-class activities (i.e., Shakespeare in the park, dinner at a restaurant, rappelling trip, etc.). Participants must sign a release and indemnification agreement prior to participating in off-campus activities. Participation in the seminars is not mandatory, though it is strongly encouraged. Attendance is taken at each seminar and reported to the FIG Office. Students do not receive a grade or academic credit for the seminar.

A syllabus is distributed at the first seminar meeting. Elements of the syllabus typically include advisor and mentor names and contact information, FIG objectives, FIG program mission statement, FIG program goals, attendance

policy (which encourages weekly attendance due to the cooperative nature of the seminar), religious holiday observance policy, students with disabilities statement, policy on scholastic dishonesty, and course outline with each class meeting day listed.

#### Women in Engineering FIG Goals and Objectives:

- To develop a community of learners who feel connected with each other, with advisors, with faculty and staff, and with the institution.
- To introduce students to the services and resources that are available to them in their academic endeavors in the College of Engineering and at The University of Texas.
- To improve students' study skills and strategies for academic success.
- To enhance student knowledge of academic decision-making, career planning, and job related skills.
- To encourage intellectual growth and a greater tolerance for diverse ideas.
- To provide students with a working knowledge of academic requirements and policies and procedures in the College of Engineering.
- To increase students' awareness of their individual strengths and interests as they relate to academic and career planning.
- To encourage life long learning.

#### UT FIG Program Mission Statement:

The FIG program is to help new students to succeed by supporting them academically, developmentally, and socially through a cohort registration structure, a supplemental seminar, and interaction with faculty, advisors, and other students.

#### UT FIG Program Goals:

- To help students connect with each other, faculty, advisors, and the institution.
- To help students make the transitions from being a high school learner to a University learner.
- To introduce students to resources that can support their academic work and other support services.
- To provide students a positive role model.
- To be a forum where students can explore their intellectual interests or major.

#### Model I: Fall 1998

- Weekly seminar (Thursdays 3:30 – 4:30 pm)
- Co-enrollment in Differential and Integral Calculus, Principles of Chemistry I
- Advisors: WEP Director, WEP Program Coordinator, Engineering Academic Advisor, Peer Mentor
- Non-residential

#### Retention Information

18 enrolled: 8 left Engineering (3 Communication, 2 Liberal Arts, 2 Education, 1 Natural Science), 3 left UT - 39% retained in Engineering (as of spring 2002)

When did they leave? Last semester of engineering enrollment...

Spring 1999 – 2  
Summer/Fall 1999 – 6  
Summer/Fall 2000 – 1  
Spring 2001 – 1  
Summer/Fall 2001 – 1

#### GPA Information (as of spring 2002)

All: 3.00  
Engineering: 3.06  
Non-engineering: 2.97

**Programming Cost:** \$254.45 (snacks, *Making Your Mark* books, bowling)

**Summary:** This was a successful first try, though our retention rates were not as high as expected. It seemed that we helped a number of students discover that they were not suited to be engineers and encouraged them to find majors that were more commensurate with their skills and interests. Student participation in the seminars was good because of the enthusiasm of the peer mentor. However, group cohesiveness was marginalized by having seminar meetings in conjunction with two other FIG groups early in the semester. The students did not have meaningful interactions with each other in such a large setting. Three people in the advisory capacity was excessive and did not allow for the detailed and personalized planning that can be coordinated by one. WEP staff did most of the seminar planning with limited input from the peer mentor. Academically, 89 percent of the women in the FIG received a grade of A or B in Calculus versus 59 percent of students in the class who were not enrolled in any FIG. Seventy-eight percent of the women in the FIG received a grade of A or B in Chemistry versus 64 percent of students not enrolled in a FIG.

#### Model II: Fall 1999

- Weekly seminar (Wednesdays 3:00 – 4:00 pm)
- Co-enrollment in Differential and Integral Calculus, Principles of Chemistry I
- Advisors: WEP Director, WEP Program Coordinator, Peer Mentor
- Non-residential

#### Retention Information

13 enrolled: 5 left Engineering (3 Liberal Arts, 1 Pharmacy, 1 Education), 1 dismissed from UT - 54% retained in Engineering (as of spring 2002)

When did they leave? Last semester of engineering enrollment...

Spring 2000 – 1

Summer/Fall 2000 – 1  
Spring 2001 – 1  
Summer/Fall 2001 – 2

**GPA Information** (as of spring 2002)

All: 2.68  
Engineering: 2.77  
Non-engineering: 2.56

**Programming Cost:** \$295.43 (snacks, *Making Your Mark* books, bowling)

**Summary:** Students in this group formed more study groups and formed close friendships within the group. A small room with a round table was selected for the seminar. Not enough attention was given to engineering careers during the seminar. WEP staff planned seminars in conjunction with the peer mentor. On the first day of class the students were given a survey specifically to garner their feedback on the syllabus, much of which had been predetermined. The questions were: “Any concerns?” “What looks good?” “What looks boring?” and “Any suggestions?”. This information was helpful and allowed us to modify prospective sessions to better meet students’ needs and wants while also addressing some of their concerns. Students were asked to sign an agreement that they would remain in engineering for the fall 1999 semester, and that they would participate in the FIG seminars (with each date listed). Perhaps this led to an increased sense of commitment and improved attendance. A scavenger hunt on the second day of class allowed students to work in randomly selected teams of three to find out about University resources. Information was reported back to all students in the seminar. A tutoring session for Chemistry was provided during one seminar, and allowed students to participate in a non-threatening group-study environment with a skilled Chemistry tutor. A collage exchange on the last day of class provided closure to the seminar, and provided a final opportunity for the students to get to know better one other student in the FIG (to whom they presented the collage).

**Model III: Fall 2000**

- Weekly seminar (Thursdays 3:30 – 4:30 pm)
- Varying co-enrollment in Differential and Integral Calculus; Sequences, Series, and Multivariable Calculus; Principles of Chemistry I (based on individual placement in Mathematics and Chemistry)
- Advisors: WEP Program Coordinator, WEP Engineer-on-loan, Two Peer Mentors
- Non-residential

**Retention Information**

12 enrolled: 1 left Engineering (Business) - 92% retained in Engineering (as of spring 2002)

When did they leave? Last semester of engineering enrollment...  
Fall 2001 – 1

**GPA Information** (as of spring 2002)

All: 3.30  
Engineering: 3.31  
Non-engineering: 3.17

**Programming Cost:** \$363.36 (snacks, bowling, campus tower tour admission, dinner out, reunion dinner)

**Summary:** Though we attempted co-enrollment in this FIG, academically, the group dynamic was not unified. Some students found themselves in different sections of the same courses, or in a higher level mathematics course. This was a result of initial planning to have two FIGs for women in engineering: one for mixed engineering majors, and one for electrical engineers. Neither had sufficient enrollment to be held individually, hence they were combined into one FIG with both advisors and both peer mentors sharing the responsibilities. After some time, the group became cohesive, and some close friendships formed. Many of the students overcame initial shyness and were vocal during the seminar. This group seemed to have a better initial understanding about careers in engineering. A session on study groups was a challenge because of varying course enrollment. This frustrated the students who wanted to be able to form study groups with their fellow FIG members. Two faculty members talked about their research. Though many of the students found the presentation fascinating, some did not feel it was relevant to them if it was outside of their particular field of engineering study.

**Model IV: Fall 2001**

- Weekly seminar (Thursdays 4:30 – 5:30 pm)
- No co-enrollment
- Advisors: WEP Program Coordinator, Peer Mentor
- Residential: Students live together on floor in honors residence hall

**Retention Information**

14 enrolled: 1 left Engineering (Architecture) - 93% retained in Engineering (as of spring 2002)

When did they leave? Last semester of engineering enrollment...  
Fall 2001 – 1

**GPA Information** (as of spring 2002)

All: 3.32  
Engineering: 3.27  
Non-engineering: 4.00

**Programming Cost:** \$575.39 (welcome goodie bags, birthday cake, craft activity, campus tower tour admission,

dining hall dinners for advisor and peer mentor, dinner out, final catered dinner)

#### **Evaluative Findings (as reported on course surveys):**

Averages based on a 5 point likert scale (1 = Definitely No, 5 = Definitely Yes) – survey completed by 12 participants

- Weekly meetings were valuable – 4.3
- FIG helped develop study skills for UT – 3.8
- FIG improved knowledge of college/major – 4.4
- FIG helped me feel comfortable at UT – 4.3
- Learned about campus resources – 4.6
- Feel as if part of UT community – 4.5
- Peer mentor easy to approach – 4.9
- Professional advisor sensitive to needs – 4.8
- FIGs recommended to new freshman – 4.6

**Summary:** This model proved successful in that the students enjoyed living together and most became part of a close-knit community. The more outgoing students sought out the introverts and included them in group activities and discussions. The advisor and mentor frequently ate dinner in the dining hall with the students, which added to the camaraderie among the group. Attendance was excellent. The mentor planned the majority of activities. On at least one occasion, the FIG program served as a recruitment tool by encouraging a student to attend UT Austin, versus another engineering school that had been at the top of her list.

### **FIG ADMINISTRATION**

#### **Planning Timeline**

**Prior fall:** identify and secure courses for co-enrollment, select day and time for seminar, identify peer mentor

**Prior spring:** advertise (if residential), train peer mentor, secure room for seminar, begin syllabus planning

**Summer:** advertise, conduct FIG registration at summer orientation, welcome letter to participants, finalize syllabus, organize sessions and speakers

**Fall of:** weekly meeting with peer mentor, mid-semester evaluation, create final evaluation

**Spring following:** wrap-up with peer mentor, hold reunion

#### **Advertising and Marketing**

Students initially learn about FIGs during summer orientation. A minority of students have researched University programs available to them their during their first year and come to orientation already hoping to participate in a particular FIG. A brochure listing all FIGs and the classes of co-enrollment offered, or any other special or differing feature of the FIG, is provided to each student. All orientation staff and advisors are briefed on the myriad of FIGs offered in each school or college. Enrollment in a FIG is strongly encouraged. The benefits of FIG are lauded (particularly co-enrollment in set required courses; often full

and closed for registration). During their individual advising appointments, students often experience the “hard-sell” from student, staff, and faculty advisors.

The FIGs for women in engineering included pre-marketing during the summer for models III and IV. The concern that prompted the extra marketing push, is that a limited number of women are initially interested in participating in an all-female academic program. A few students are exceptionally drawn to the offering, but many are concerned about lack of opportunity to meet their male counterparts.

For the residential FIG in fall 2001, a letter encouraging participation was sent in March prior. Students were asked to notify the division of housing that they would like to participate in the program by May 1. However, not all slots were filled and recruitment continued through all summer orientation sessions.

#### **Peer Mentors**

Peer mentors are upperclass students who have been academically successful. Mentors are selected through an intensive application and interview process (including a role play and lesson demonstration). The process is conducted by the FIG Office (part of the Office of the Vice President for Student Affairs) in conjunction with representatives from each college and school. Mentors receive extensive training (described below) and have numerous responsibilities. In some FIGs, the mentors are solely responsible for planning and executing the FIG seminars. In others, the efforts are shared jointly between mentor and advisor. The mentor is also responsible for delivering a copy of the syllabus to the FIG Office early in the semester. He or she also takes attendance for the semester. Each mentor has a mailbox in the FIG Office, and is responsible for checking it periodically. Mentors must complete a number of evaluative pieces about their experience at the end of the semester.

#### **Peer Mentor Training**

Training takes place primarily in the spring semester prior to the FIG. Topics include classroom facilitation, group dynamics, study skills, conflict management, and an in-depth introduction to campus resources. Training is coordinated by the FIG Office. Students are given a manual and contact information for potential seminar facilitators. Mentors are also scheduled time during all-FIG training to meet individually with their advisors for planning purposes. Returning mentors are also required to participate in extensive training.

#### **Financing**

The cost of snacks and supplies compose the primary expenditure for most FIGs. Many FIGs include meals at restaurants, off-campus events, and special awards in their budgets. The mentors are paid a stipend of \$300 by the Office of the Vice President for Student Affairs. This office also contributes \$100 to each FIG for program expenditures.

That money has been matched with an additional \$100 from the College of Engineering. Any additional expenses for the women in engineering FIGs were covered by WEP or by a special grant for engineering initiatives given by the University Co-op.

### Evaluation and Statistics

Course surveys are completed for every FIG. Students spend the last day of the seminar filling in short-answer and likert scale questions. All studies indicate that students are satisfied with the FIG program and enjoy the FIG experience. Most students would recommend FIGs to new first year students. FIG participants frequently form study groups and are aware of various campus resources. Interaction with peer mentors has also been rated highly.

An informal email survey of all women in engineering FIG participants conducted in March 2002 yielded the comments found below. Please note that quotes are displayed verbatim, with no edits for spelling, grammar, punctuation, etc.

- “The FIG really helped me to get to know the campus and all kinds of resources that we can have access to. I got to meet lots of peers from the same college and i think that's very important.”
- “Socially, I became good buds with a couple of the girls in the FIG. I've lived with one for the past two years, and I've gone on several trips with another one. Academically, my first semester was one of my best semesters here. I think it's due to all the support from the FIG. At the meetings we were always asked how our classes were going, when our tests were, if we all wanted to get together to study....it was very easy to get a study group together.”
- “I know some people wished it could last a year instead of one semester...”
- “It would have been very cool if the FIG would have been for the whole freshmen year. I know at the end of the first semester a lot of us wanted to take the next round of classes together, but it's really difficult to get that many people in the same classes on your own. Also, the second semester of your freshmen year is just as difficult as the first semester, and having your buddies from FIG with you makes it a little easier.”
- “FIGS RULE”

Profile of University-wide FIG Program				
	1998	1999	2000	2001
FIGs	29	52	105	114
Students	494	1003	1977	2280
Colleges	4	7	10	10
Advisors	18	46	87	98

GPA After First Semester				
	1998	1999	2000	2001
FIG	2.97	2.86	2.99	2.99
Non-FIG	2.95	2.81	2.89	2.80

Overall GPA in College of Engineering				
	1998	1999	2000	2001
FIG	3.37	2.78	2.88	2.97
Non-FIG	3.07	2.80	2.94	2.93

### CONCLUSIONS

The FIG program has been a great benefit to the students at The University of Texas at Austin. Though the women engineering students that have enrolled in these FIGs have not maintained retention rates as high as expected, the women in the program have benefited by increasing their acclimation to the university, nurturing friendships, and gaining a better understanding of where their career interests fall. While the FIG model utilized by WEP has evolved and will continue to evolve as the program matures, some key lessons have already been learned:

- One staff and one peer mentor are optimum for the most favorable group dynamics
- A residential program tends to lead to more camaraderie (though being able to offer both a residential and non-residential FIG at the same time would allow for students with a strong preference for one or the other to participate)
- Co-enrollment in a cohort of classes contributes to group cohesiveness
- Participation in a FIG does not necessarily lead to a higher GPA
- FIG students are more likely to participate in study groups, which frequently lead to a greater sense of community
- FIG students find the FIG experience positive and are likely to recommend the program to others
- A residential FIG can serve as a recruitment tool, appealing to both students and parents

This type of program will not appeal to all students, though it has attracted students who have typically not participated strongly in other WEP programs. This program aids WEP in reaching students who have not been interested in “one-shot” programs and enables the WEP staff to interact with students on a more personal level. Through effective advertising and marketing of the FIG program and through continued improvement based on lessons learned from previous models, student and mentor feedback, and participant evaluations, retention rates should increase over time.