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University of Central Florida 1985 Self Study Southern Association of Colleges and Schools: Department of Electrical Engineering and Communications Self Study Report

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UNIVERSITY OF CENTRAL FLORIDA

1985
Self Study

SOUTHERN ASSOCIATION OF COLLEGES AND SCHOOLS

DEPARTMENT OF ELECTRICAL ENGINEERING AND COMMUNICATIONS

SELF STUDY REPORT

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1. Philosophy

1.1 Role in the University and the Community

The role of the Electrical Engineering and Communications Department (EECS) is to provide Programs of Instruction at the Bachelor's, Master's and Ph.D. levels in Electrical Engineering; to advance instruction and practice of Electrical Engineering through research and through service to the profession; and to serve the University, the community, the state and the nation.

1.1.1 Instruction

In addition to the major's program the department provides instruction in the college "CORE" program, a service course for Computer Science majors and courses required in the College's EMCS program. The distribution of Fall Semester departmental SCH's for the past three years has been on the order of:

Engineering Core - 40%
EECS Option (UG) - 41.5%
EECS Option (G) - 12.5%
EECS Service (CS) - 6.0%

Instructional activity in the area of Engineering CORE consists of the required courses of electrical science (EGN3383), introductory circuits (EGN3373), and electronics (EGN3375C) for all engineering majors and linear controls (EGN4714) for EMCS

and MEAS majors. EEL4342C is a required course in the EMCS undergraduate program and EEL5365 and EEL6349 are required courses in the EMCS graduate program. The department offers an introduction to logic design (EEL3341C) for Computer Science majors (CS).

A major service role is anticipated in the planned computer engineering program (department). The EECS option courses EEL4342C, EEL4343C, EEL4701C and EEL4702C will support the undergraduate program. At the graduate level EEL5365 and EEL6349 will also be initially required by the new department. Once the new department is staffed and the undergraduate program is implemented, EEL4701 and the graduate courses will mostly likely be replaced in the new program by more appropriate computer engineering courses (a result of the more specialized nature of the new program). Beginning in the Spring Semester of 1985, the electrical science course (EGN3383) will be offered by the Department of Physics.

1.1.2 Research

The role of the department in research is to support the research and development needs of local industry and government laboratories; to provide opportunities for both student and faculty development in the practice of engineering through both engineering research and development activities; and more pragmatically, to supplement the scarce resources available to engineering education. The major areas in which funded

research has been performed are digital systems and electro-optics. Micro-electronics, and communications activities have also been funded.

1.1.3 Service

The EECS Department supports the professional community through seminars and workshops, conferences, sponsored credit institutes, off campus instruction, and leadership in local, regional and national professional societies and organizations. Activities in these areas are also discussed in Sections 3.1 and 9.

Industry in the Central Florida area is largely Electrical Engineering oriented. There is rapid development and growth. The EECS Department at UCF has and can continue to play a key role in the expansion of this industry and in economic development of Central Florida through service to this particular community. Orlando is a national center for professional conferences. The EECS faculty regularly participate in the planning and operation of these conferences.

Included in the community activities of the faculty of the EECS Department are participation in 1) programs for the gifted in Osceola County, 2) science workshops at the John Young Museum, 3) the Orange County Engineering Club, 4) articulation with the community colleges, 5) regional science fairs, 6) a

community Hospital Board, 7) and support for the hearing disadvantaged as well as religious and community organizations in Central Florida.

1.2 Evaluation and Projections

The services that the EECS Department provides to the community and to the University are and will continue to be unquestioned with regard to need for the next decade. The instructional program is largely a majors program and the number of majors continues to increase - at a rate which is straining the human resources of the department. The need for Electrical Engineering graduates, especially at the Ph.D. level, is great not only at the local and regional level, but also at the national level. It is projected to continue and increase through the next decade. Great needs also exist for off campus education. The EECS Department is and will continue to be a major participant in the Florida Engineering Education Delivery System (FEEDS) program.

The research program largely supports local laboratories and industries. There is a strong correlation between excellence in university research and growth in the local industrial community. In addition, the UCF Research Park and the Engineering and Industrial Experiment Station (EIES) present demands to the EECS Department which are expected to increase through the next decade.

There is an increased awareness of technical issues in all sectors of the community. The EECS faculty will continue to be called on to

provide leadership and assistance in this important area.

Great changes will have to be made in the next decade to continue to improve and maintain the department's ability to meet the demands placed on it. These changes are dictated by the increasing number and nature of the demands and the scarcity of Ph.D. level faculty to meet these demands. The need for support for the improvement of Electrical Engineering Education is widely recognized and is presently a national priority. UCF, the Central Florida Community, and the State of Florida perceive a similar need. Changes, in addition to an improvement in the student faculty ratio and the present low level of support, must be strongly considered. These changes include a revision of the curriculum, changes in the nature and level of administrative and technical support and limitations on enrollments.

The above is an evaluation and projection of the need for a strong and effective Department of Electrical Engineering at UCF. A summary of present critical needs in each of the areas (instruction, research, and service) is presented in an accompanying document, "Self Study Summary" which is being prepared by the EECS faculty.

2. Organization

2.1 Duties and Staffing

The EECS Department is organized as a faculty with a half-time department chairman and three secretaries. Technical and administrative support is provided by the College of Engineering and

the University. Departmental Faculty Committees include committees on Curriculum (with subcommittees), Recruitment, Graduate Studies, Laboratories, and Research.

The tenured and tenure earning faculty consists of: six full professors, (Drs. Erickson, Patz, Phillips, Simons, Towle, and Walker); three associate professors (Drs. Miller, Petrasko, and Walters); and two assistant professors (Drs. Harris and Malocha). There are two instructors (Mr. Belkerdid and Mr. Litka) and four visiting faculty (Mr. Martin and Mr. Radloff - Assistant Professors, Mr. Richie and Mr. Gatt - Provisional Instructors). In addition, Dean Bruce Mathews and Dr. Harden, Director of the South Orlando Residence Center, teach regularly in the department. There are a number of vacant positions, including the chairman position. The department typically uses two adjuncts per term. Graduate Teaching Assistants are assigned duties in laboratory instruction, and in the Spring and Fall Semesters of 1983 one graduate student was assigned as instructor of an engineering core course, EGN3383. The department typically employs twenty-five to thirty student assistants (graduate and undergraduate) to assist in homework grading and laboratories.

Staffing is the most critical issue in the department.

Tenure earning faculty are being sought through national advertizing and personal contacts. Further comments are provided in Section 5.1. Visiting faculty and instructor level faculty have been actively recruited in the Central Florida region and are being encouraged to

pursue the Ph.D. degree at UCF. Adjunct faculty are recruited from local industry. Graduate students are being recruited primarily from the undergraduate student population and from local government agencies, laboratories and industry.

Undergraduate student assistants are selected on the basis of academic performance and potential as graduate students.

The salary structure for tenure-earning faculty is competitive, relative to national salary figures for engineering educators, at the newly appointed assistant professor level and less so at the senior ranks. Salaries for non-Ph.D. degree visiting faculty and instructors are not competitive with non-academic positions and given current career opportunities in academia for non-Ph.D. faculty, are attracted only by the prospect of completion of the Ph.D. program. The latter limits their participation in many departmental activities and presents an unbalanced workload for the faculty as a whole. Graduate student salaries have been relatively constant since 1982.

Allocations for faculty positions presently appears to exceed opportunities for improving the department's staffing position. This is a result of many factors, both internal and external. The most pressing need is for an aggressive recruitment policy and an improved employment environment. A suggestion for improving the staffing situation and the ability of UCF to recruit new faculty is the use of non-tenure earning positions (instructor, engineer, scientist, etc.,) to support instruction and laboratory activities in the department. These positions should be administered at the department level.

There is no substitute for qualified faculty. The above suggestion addresses faculty support in a time of increasing enrollments and research expectations.

	<u>1979-80</u>	<u>1980-81</u>	<u>1981-82</u>	<u>1982-83</u>	<u>1983-84</u>
Chairman	.5	.5	.5	.5	.5
Professor	4.5(0,0)	5(0,0)	5(0,0)	5(0,0)	5.5(.0,1)
Assoc. Prof.	3(0,0)	2.5(0,1)	3.5(0,1)	3.5(0,1)	3(0,1*)
Asst. Prof.	1(0,0)	1(0,0)	1(0,2)	2(1,1)	2(2,2*)
Instructor	0(0,0)	0(3,0)	0(3,1)	1(4,0)	2(2,0)
Total					
Allocated	9(0,0)	9(3,1)	10(3,4)	12(5,2)	13(4,4*)
Total Used	9	12	13	17	17

*Tentative

Legend: Hardlines (Visiting lines, Vacant lines)

EECS Faculty Staffing History

Table 2.1

2.2 Support and Communications

The College of Engineering provides major support in areas which include new student orientation, class and classroom scheduling, registration, graduate student files, external and off-campus

education, contract and grant (C&G) information dissemination and administration of internal funds, and administration of technical support. The University's Division of Sponsored Research (DSR) also provides C&G Information and some secretarial and staff support in meeting C&G reporting requirements.

Departmental Communications with students is accomplished primarily by posting information on two departmental bulletin boards and by an open-door policy at the chairman and faculty level. Student organizations have been very active in the past but are less active presently. The IEEE student branch needs revitalization and faculty seminars should be introduced as a regular activity to promote faculty-faculty and faculty-student communications.

2.3 Projections

Departmental planning activities are initiated at the chairman's level and are assigned to faculty committees and subcommittees.

Administrative support for the chairman in the form of an assistant chairman is critical if planning and development performance is to be improved.

A great deal has been accomplished in the areas of undergraduate option curriculum and laboratory improvement, planning for the new engineering building, the Ph.D. program and administration of same and capital equipment purchases.

Emphasis must be placed on recruitment of faculty and graduate

students, revision of the undergraduate and graduate curriculum, facilities and support for the teaching and research components and on faculty development.

3. Educational Program

3.1 Correlation of Program and Objectives

The goals of the EECS Department are: 1) to provide undergraduate majors with a curriculum and instruction which is of high quality and meets the needs of a dynamic profession; 2) to support the CORE Program in the College of Engineering; 3) to provide service courses to the Computer Science Program and other option areas in the College of Engineering; 4) to provide high quality and relevant graduate programs.

The courses offered by the EECS Department provide a basis for achieving the goals of the department, and are heavily enrolled.

The EECS Department offers live and/or video taped courses at each of the three residence centers. A modest laboratory is maintained at the South Orlando Center. The department participates in the statewide FEEDS program and has co-sponsored with the EMCS Program, a special graduate degree program for General Electric in Daytona Beach. The GE ABC Program with UCF has replaced the above. The department has also offered workshops and Sponsored Credit Institute courses in the central Florida region.

3.2 Admissions

The College of Engineering has recently implemented a limited access program which requires students to maintain a 2.25 grade point average. This has had a very limited impact on the rising enrollments in Electrical Engineering.

Students from the Community College System fit well in the present curriculum. There is very little difference in student performance after the initial transition from the community college system programs.

3.3 Enrollment

	<u>78-79</u>	<u>79-80</u>	<u>80-81</u>	<u>81-82</u>	<u>82-83</u>	<u>83-84</u>
HC (Fall)						
MG	349	417	469	560	650	765
PB	26	27	53	32	36	59
G	31	45	29	49	71	81
Total	406	489	551	641	757	905
Degrees (Yr)						
BS	55	64	64	63	109	
MSE/MS	6	10	5	4	10	

Number of Majors and Degrees Awarded

Table 3.3

The recruitment of undergraduate students with high potential is a joint effort with the College of Engineering. The department has

been successful at recruiting graduate students from the undergraduate student body. Special attention to the allocation of undergraduate student assistant positions and personal attention in this area by a number of faculty have been the major mechanisms used for this purpose. Recruitment of out-of-state graduate students is a problem area which needs to be addressed.

Courses offered to fewer than ten students have been primarily in the areas of electro-optics and micro-electronics. These areas are developing and are critical in terms of local industry needs and the department's goals.

3.4 Curriculum

	<u>1978-79</u>	<u>1979-80</u>	<u>1980-81</u>	<u>1981-82</u>	<u>1982-83</u>	<u>1983-84</u>
LD	4130.7	4120.3	4085.7	3639.0	4560.0	3268.0
UD	21691.1	22801.0	26682.5	27083.2	32238.2	34777.6
G	1992.7	2406.6	2333.9	2365.9	3226.0	4231.9
Total	27814.5	29327.9	33102.1	33088.1	40024.2	42277.5

Student Credit Hours by Year - College

Table 3.4A

	<u>F-81</u>	<u>F-82</u>	<u>F-83</u>	<u>Sp-84</u>
EGN CORE	1276	1419	1833	1923
EECS Service	156	252	246	273
EECS Option-R	877	1150	1512	1524
EECS Option-E	251	423	380	618
EECS BG	237	288	384	233
EECS AG	68	150	147	323
EECS Thesis/RR	35	57	49	52
Total UD SCH'S	2560	3244	3971	4338
Total G SCH'S	<u>340</u>	<u>495</u>	<u>580</u>	<u>608</u>
Total SCH'S	2900	3739	4551	4946

Student Credit Hours by Fall Semester (and Sp. 84) - Department

Table 3.3B

	<u>F-81</u>	<u>F-82</u>	<u>F-83</u>	<u>Sp-84</u>
EGN CORE (C-S-L)	3-6-8	4-11-3	4-9-7	4-10-7
EECS Service (C-S-L)	1-1-3	1-1-4	1-1-4	1-1-4
EECS Option-R (C-S-L)	5-6-9	5-9-11	5-10-14	5-10-11
EECS Option-E (C-S-L)	3-3-5	4-4-5	3-3-5	5-5-9
EECS BG (C-S-*)	4-4-*	3-3-*	3-3-*	3-3-*
EECS AG (C-S-*)	2-2-*	3-3-*	3-3-*	6-6-*
EECS Thesis/RR (HC)	(16)	(23)	(27)	(22)
Total UD (C-S-L)	12-16-25	14-25-23	13-23-29	15-26-31
Total G (C-S-*)	6-6-*	6-6-*	6-6-*	9-9-*
Total (C-S-L)	18-22-25	20-31-23	19-29-30	24-35-31

*Video Taped for Presentation at Centers and Other Sites

Courses (C), Lecture Sections (S), and Laboratory Sections (L)
by Fall Semester (and Sp. 84) - Department

Table 3.4C

At the undergraduate level the Electrical Engineering option of the Bachelor of Science in Engineering Program (BSE) consists of 29 hours of coursework. The student must take five required courses (18 hrs.) and three or four courses which are technical electives (11 hrs.). There are no free electives. At present there are nine regularly scheduled 4000 level technical elective courses. The only area which is supported by more than one technical elective course is the digital systems area with four courses (EEL4701C, EEL4702C, EEL4343, and EEL4570C). A student can select all three of his/her electives from this area. This is discouraged because of the lack of minimal depth provided by the required course in the important area of electronics (EEL4309C and EEL4308C). The catalog course EEL4800C (Analog Computers) has not been taught in a number of years. Concentration in a specific area of electrical engineering is difficult at the undergraduate level.

There are two master's programs, the Master of Science in Engineering (MSE) and the Master of Science in Electrical Systems and Sciences (MS). Each program is a thirty credit hour program with an option of either a thesis (6 credit hours) or a research report (3 credit hours). The areas of concentration are: Communications, Controls, Digital Systems, Digital Signal Processing, Electronics and Electro-Optics. Each concentration is supported by a minimum of three courses.

The Ph.D. program has as an entrance requirement, a master's degree

in Electrical Engineering or a closely related area. The program consists of 60 hrs of coursework and 24 hours of Dissertation work. A Dissertation is required.

The College Philosophy emphasizes breadth. This limits concentration in the EECS Option at the undergraduate level. There is a great need for major changes in the curriculum. However, the college philosophy coupled with the small number of EECS faculty limit opportunities for the needed changes.

Changes in the college "CORE" are considered by a college-wide committee. Change in the departmental offerings are considered at the departmental level. A major change was considered and endorsed at the departmental level in 1983. It requires changes at the college level.

Courses taught in other departments that should be taught in the EECS Department are primarily in the area of digital systems in the Department of Computer Science. The policy of allowing this duplication is a result of University emphasis in Computer Science and possibly the large number of majors in both programs. The recent establishment of a Department of Computer Engineering will also impact the question of responsibility for the discipline area of digital systems.

The EECS Department does not offer any courses which are commonly associated with the general education program. In the past departmental faculty supported the EGN48XX group of courses which were

identified with the advanced component of the general education program. Special "Honors" or remedial programs are not available.

The department curriculum is highly structured at the undergraduate level. Prerequisites are clearly identified and performance in a particular course is strongly dependent on the prerequisite material. The structure is maintained by a strong faculty advisement program.

The prerequisite structures for the graduate programs are less specific and in the MS program particularly, this has presented a problem. Recent changes in the catalog have addressed this problem and the present effort of publishing a definitive departmental graduate manual should also help. Additional deliberations are needed in this area. A number of experimental courses have been offered in the past ten years. A course which is under consideration for addition to the curriculum is first offered as a special topics course. Effectiveness is evaluated by the faculty and if merited, the course is added to the curriculum.

There are no free electives in the undergraduate curriculum.

Restricted electives in the option area represent 11/29 or 38% of the option program.

The number of credit hours assigned to a course is generally one credit hour for each hour of lecture per week and one credit hour for each three hours of laboratory per week. Given the high proportion of resources associated with the laboratory component, a change in this method should be considered. Instructional programs in

electrical engineering are very laboratory intensive and due to rapidly advancing technology, necessarily so. There is a need to redefine the importance of the laboratory component and support it in terms of assigned faculty time and improved technical services. An increase in credit hours would emphasize this position. There is a high demand for graduates of the EECS program and those who gain employment in the Central Florida region are considered excellent engineers.

There is a need to expand the present undergraduate program. However, a number of considerations and constraints exist which may preclude expansion. The constraints and considerations are an increasing student-faculty ratio, a limiting college philosophy and a need to improve the EECS graduate instruction and research programs. Expansion is needed in the type and number of course offerings. The addition of required and elective undergraduate courses should include courses in electronic materials, electro-optics, digital electronics, computer-aided design, and a capstone design course.

The needs in terms of curriculum are considered at two levels: national and regional or correspondingly -- the needs resulting from changes and projected changes in the profile of the profession and the needs resulting from the profile of the industry in the region. These needs are identified by active monitoring of statements on needs at the national level (Model Curriculum activities) and meetings with local industry.

The major changes in the profession of electrical engineering are

a result of technology advances in the way information is transmitted (communications) and processed (digital and analog systems). The devices which are used in systems for the above are being integrated at higher and higher levels (microelectronics) and are taking on new forms (electro-optics). The engineering science needed to understand these areas is increasing, (material science, electromagnetic fields, etc.), and the techniques to use new technology to construct complex systems is also expanding (computer aided analysis, computer aided design, etc.). This explosion of additional needs is straining the concept of a common curriculum which is constrained by time (i.e., a 4 year curriculum).

The solution of the majority of academic institutions is to reduce the breadth in the general area of engineering in order to provide breadth and depth in electrical engineering. This has also been proposed by the EECS faculty at UCF. However, this is not a total solution.

The EECS department has presented as its goals, emphasis in the important areas of digital systems and communications. The fundamental technologies of these areas are microelectronics and electro-optics. Traditional areas such as power, controls, electromagnetic fields, etc., have been reduced especially at the undergraduate level.

In order to meet these goals, the areas of microelectronics and electro-optics have given special attention in recent years. These areas are in need of faculty, technical support, and curriculum

development and expansion.

The goals identified above are derived from and are consistent with the direction in which the profession and local industry is moving. UCF is in the fortunate position of being in a geographic area in which the path of local industry parallels the path of the profession at the national level.

Areas of Concentration and Faculty Expertise

Electromagnetic Field and Waves - Dr. Erickson, Dr. Patz,
Dr. Mathews, Mr. Litka

Circuits and Electronics - Dr. Walters, Dr. Miller, Dr. Walker,
Mr. Martin, Dr. Harden

Controls and Circuits - Mr. Radloff, Dr. Simons, Dr. Towle,
Dr. Harris

Communications - Mr. Belkerdid, Dr. Harris, Dr. Phillips,
Dr. Malocha, Dr. Mathews

Digital Systems - Mr. Gatt, Mr. Richie, Dr. Petrasko, Dr. Patz
Dr. Towle, Dr. Simons

Digital Signal Processing - Dr. Simons, Dr. Harden

Micro Electronics - Dr. Malocha, Dr. Walker, Mr. Richie

Electro-Optics - Dr. Phillips, Dr. Walters, Mr. Belkerdid

The areas which are in need of additional faculty are Communications, Microelectronics, and Digital Systems. The establishment of a new Department of Computer Engineering may result in the movement of some faculty to the new department and consequent additional faculty needs in EECS.

3.5 Instruction

	<u>F-78</u>		<u>F-79</u>		<u>F-80</u>		<u>F-81</u>		<u>F-82</u>	
	UD	G	UD	G	UD	G	UD	G	UD	G
Total										
No.	168	114	163	120	274	106	371	138	505	180
A	35.7	49.1	27.6	35.2	25.9	27.4	21	34.1	28.05	32.2
B	28.6	13.1	35.5	32.5	32.9	37.7	31	37.7	30.3	21.7
C	19.6	1.8	22.7	5.8	27.0	2.8	23.45	6.5	23.6	3.3
D	7.1	1.8	9.2	1.7	3.7	1.9	7.0	.7	6.3	0
F	4.8	2.6	3.1	1.7	.7	1.9	4.85	1.4	2.6	.5
WP	3.0	14.0	4.3	5	7.2	6.6	11.6	5.1	6.7	12.8
S		5.3		8.3		5.7	.3	8.7		5.6
U				.8						
I	1.2	12.3	.6	11.7	12.6	16.0	1.1	5.8	2.0	23.9

Grade Distribution - Department

Table 3.5

Course syllabi for all courses are on file in the EECS office. The syllabi are reviewed every four or six years by an accreditation team for the purpose of ABET accreditation. Faculty use course syllabi or course outlines derived from course syllabi to prepare course outlines for each semester.

Adjunct faculty are used to teach evening sections of multi-section undergraduate courses. They are given assistance by faculty teaching other sections of the same course and are often provided assistants for the purpose of grading homework and/or maintaining daytime office hours.

The department evaluates the effectiveness of instruction in a number of ways. Course effectiveness is formally evaluated by students, informally evaluated by the chairman using student, faculty and employer comments, and by external evaluations as a result of accreditation visits.

3.6 Other Activities

Major departmental activities include clubs and honor societies. There is a need to provide more activities in the areas of visiting lectures, seminars, and help sessions. There are two professional society student chapters, IEEE and IEEE Computer Society. The student chapters have faculty advisors (Dr. Miller and Dr. Patz, respectively) and chapter activity has been strong in the past, as demonstrated by first place positions in the College Engineering Fair and national recognition for service in

the IEEE Computer Society Student Chapter (Mr. Tom Tours - 1982). A Nobel Prize winner and distinguished international, national, and local scientists and engineers have presented lectures in electro-optics and microelectronics. A seminar started in 1982 has not been continued.

3.7 Projections (5 years and 10 years)

Proposed changes in the existing philosophy, staffing, and curricula will require significant administrative and faculty effort and changes in the environment external to the EECS Department.

It is hoped that within the next five (and ten years) there will be more opportunities for concentration at the undergraduate level; a larger proportion of faculty in communications, digital systems, microelectronics and also in the electro-optic area at the graduate level, and a curriculum which will better meet the needs presented in Section 3.4.

Without a limited access control mechanism the enrollments will continue to grow. The demand for graduates will continue to be high.

It is anticipated that the graduate programs, especially the Ph.D. program, will become more prominent and important to the high technology environment of the Central Florida area.

4. Financial Resources

4.1 Outside Funding

The Solid State Devices Laboratory (SSDL) is recipient of an industrial affiliates grant from Anderson Laboratories.

4.2 Auxiliary Activities

There are no "standing" auxiliary activities.

4.3 Budgets

Monies for each budget category is allocated by the College in the fall semester. Additional monies are allocated typically at the start of the spring semester and again before the summer semester. The additional monies are a result of adjustments and research release time.

Budget category expenditures and expenditure projections are discussed at faculty meetings. OPS funds are allocated on the basis of course and laboratory enrollments and departmental course and laboratory development priorities.

Expense funds are allocated for office, laboratory and faculty development (travel, short courses, etc.), and other activities on a needs basis. OCO funds are discussed below.

The major constraint associated with budget preparation and utilization is the lack of administrative time and staff support. Planning, program development, and tracking is difficult with the half time administrative position allocated to the department. Faculty are traditionally asked to assist in these activities (delegation of responsibilities). However, the high student-faculty ratio and the large number of majors (advisees) limits this form of assistance. A better projection of yearly funds in the fall semester would also improve the budget preparation process.

4.4 Equipment

The department has received significant OCO funding in the past three years. Significant college funds were reserved for college level projects. A very good allocation model was used in the 1982-1983 allocation of college OCO funds. At the department level, the distribution of college allocated funds is discussed and agreed upon by the faculty. Each curriculum subcommittee presents an equipment list and provides justification at a faculty meeting. Faculty are assigned to follow specific equipment through the acquisition process (specification, bidding and check-out). Department priorities in OCO acquisition are as follows: College CORE laboratories, required option laboratories, elective option laboratories, graduate teaching and research.

Expense funds to support laboratories and equipment are not sufficient to keep up with program growth and development. This is the most critical funding issue in the department.

There is generally a delay in bringing purchased equipment to full utilization. Educational software (laboratory experiments, etc.), training of graduate students, supporting equipment which requires scarce expense funds, and other needs which require faculty time and/or scarce resources are the typical causes of these delays.

5. Faculty

5.1 Recruitment and Selection

New faculty are recruited through advertizements in national professional publications, personal contacts in local industry and at other academic institutions and most recently through the Ph.D. program. A "standing" faculty search committee has primary responsibility for faculty recruitment. Faculty and chairman recommendations on candidates are forwarded to the Dean and appointment offers are made by the Provost and Academic Vice President. There are no part-time faculty.

5.2 Organization, Preparation and Growth

There are a number of sub-committees of the departmental curriculum committee which are responsible for specific area maintenance and planning. However, there are no officially organized sub-areas in the sense of assigned release time for administration.

Two areas should be considered for the above status, electro-optics

and microelectronics. Each of these areas present opportunities for external funding to meet needs which exceed the present capacity for proportionate expense and OCO funding. Official recognition, as defined above, would enhance these opportunities.

The tenured and tenure-earning faculty are well prepared in terms of earned degrees (all have doctorates), experience, length of source, research and professional activity. This preparation is directly related to the goals of the department. Faculty are being recruited for areas which are in need of additional support. Faculty resumes are on file in the EECS Department.

Faculty development is encouraged in the process of annual evaluation of faculty. There are limited opportunities for supporting the development of faculty through release time and other types of funding for development.

5.3 Salaries

Faculty salaries are determined by the EECS Chairman and Dean of the College of Engineering based on a number of evaluation criteria. There have been recent adjustments which have made the salaries of engineering faculty competitive with respect to salaries for engineering educators, nationally.

5.4 Teaching Loads

Traditionally, EECS faculty have been assigned course loads based on

the number of preparations and number of sections. The average number of students in a class has in many cases doubled and in some cases increased by fourfold. In extreme cases adjustments have been made (fewer preparations). However, the lack of faculty to meet the enrollment increases has precluded any noticeable change in the method used. Undergraduate and graduate student assistants have been used to reduce this problem but presently the attendant problems of student assistant coordination and training moderates the effectiveness of this solution. Faculty submit a list of courses they wish to teach. Generally, half of the courses which make up the course load of an individual faculty member are selected by the faculty and half are selected by the chairman.

Release time for non-funded research was nominally 5% in the early years. In the past five years, this practice was discontinued due to the non-effective nature of this level of support.

The faculty can write proposals for research support from the Engineering and Industrial Experiment Station (EIES) of the College. For the past three years, an average of three faculty have been supported for an average of 20% release time during each semester of the academic year. This often translates to between one course preparation to one laboratory assignment.

The areas which do not receive sufficient release time relative to actual effort are research report and thesis responsibilities, course and laboratory development, and committee work. The minimum number of contact hours required by the state is twelve. The ranked faculty

average approximately eighteen contact hours.

5.5 Evaluation, Security and Promotion

Promotion and tenure policies and procedures for the EECS department are the same as those for other faculty in the University with additional criteria associated with the College of Engineering. This additional criteria primarily emphasizes professional development activities and registration.

College-wide criteria are used by the chairman to evaluate faculty. Criteria are discussed by department chairman at a College of Engineering Dean's and Chairman's meeting each year prior to the evaluation process. The chairman's evaluation is one of the measures used to determine merit raises for faculty. These evaluations are also used in the tenure and promotion process as per University policies and guidelines.

5.6 Working Conditions

The department has outgrown its office and laboratory space. The EECS office suite is shared with the Department of Physics. One half of the suite is used by the three departmental secretaries, two part-time student secretarial assistants, a chairman and one faculty member. It is very crowded. In the new engineering building (which will be ready in Spring 1985) the department will also share an office suite. There is a shortage of faculty office space and laboratories. The latter has a significant negative effect on the EECS graduate and research

program. The new building may accommodate the program at its present size. Office equipment and supplies are available on weekdays and at other times upon special request. Faculty scheduling is constructed with faculty input when possible.

The most negative aspect of working conditions in the department is associated with technical support. The department has no direct administrative responsibility or authority in this area and faculty have generally taken to doing what they could to avoid direct contact with college technical support staff.

5.7 Projections

There are present needs for additional faculty and these needs will continue and increase as enrollment and constituent expectations increase. The space which will be available in the Spring of 1985 will meet present needs. Consideration should be given to continued occupancy of present space. The level and manner in which expense funds are allocated must be reviewed and revised. The entire area of technical support will become even more significant in the future, especially in light of the departmental efforts and goals in the laboratory intensive area of microelectronics. There is a present need for additional administrative positions in the department. An assistant chairman and an administrative assistant should be considered. The creation of the new Department of Computer Engineering should not strongly effect this need.

6. Library

6.1 Collections

The library holdings for all of the various sub-disciplines in Electrical Engineering are inadequate, especially in light of the recently initiated Ph.D. program. There is also a general lack of emphasis on planning in this area, partially as a result of lack of opportunities for substantial improvement.

6.2 Coordination

Coordination with the library staff is a responsibility assigned to a specific faculty member in the EECS Department. Individual faculty have sought improvement through coordination with library staff in specific areas (electro-optics). Funding has been a problem. Departmental OCO funds have been proposed to alleviate this problem. However, this has not been endorsed.

6.3 Services and Facilities

The department has not encountered any significant problems with library facilities and services on the main campus. Holdings, facilities and services must be improved at other centers and places where instruction is offered. This is critical to the success of the department's participation in the Florida Engineering Education Delivery System (FEEDS) program.

7. Student Development Services7.1 Student Mix

	White	Black	Hispanic	Other	International
	MF	MF	MF	MF	MF
LD	82/21	5/1	8/1	16/3	5/1
UD	326/46	12/2	21/4	35/8	12/1
G	96/2	5/0	7/0	16/1	9/0

Departmental Majors Minority Data (F-83)

Source: Departmental Files

Table 7.1

7.2 Advising

Initial advisement includes a college-wide orientation program and subsequent advising at the departmental level. Students are instructed in the policies, procedures and considerations in planning and realizing a program of study. Students are then assigned a

faculty advisor who assists and advises them in curriculum and career planning. Over sixty percent of the students have had previous college coursework and must petition a college level faculty committee for the transfer of credits. The process of student advising and the realization of ABET accreditation requirements for student record keeping are significant activities of the ranked EECS faculty member. A typical advisement loading per faculty is fifty majors.

Entering students are encouraged to participate in a University program to assess competency in mathematics. The results of these tests are used in initial advisement for placement in mathematics courses.

7.3 Organizations

The department sponsors one national honor society Eta Kappu Nu, and two professional society student chapters, IEEE and IEEE Computer Society. Support consists of assigned faculty advisors for each organization and other support as available.

7.4 Discipline and Records

Disciplinary action for students accused by faculty of cheating is handled at the college level (after appropriate consultation between the student, the faculty member and possibly the department chairman). Student assistants who are assigned homework grading and other duties are advised by the faculty they have been assigned to as to the detection of and procedures for cases of cheating.

Records are maintained and handled by secretarial staff and faculty and administrators.

7.5 Financial Aid and Alumni

The department employs a large number of undergraduate (approximately 12) and graduate (approximately 18) student assistants. In addition the department participates in a cooperative education program and a part-time work program. The latter is with Martin Marietta and approximately twenty-five electrical engineering majors (sophomore through senior status) work approximately twelve hours per week in laboratories at Martin Marietta. The department does not offer any full scholarships, but does employ graduate students as Graduate Teaching (and Research) Assistants or Associates. (The latter positions are typically for post master's students.) The department also has a number of graduate students who are in the UCF-Martin Marietta Industrial Affiliates Program. An Industry Associates program associated with the SSDL also provides support for graduate students.

A survey of graduates of the program is performed as part of the ABET accreditation process. In addition, faculty-industry interaction provides contact with former students and co-workers and administrators of former students.

8. Physical Facilities

Current needs exceed the present capacity of the facility. New facilities will be available in the Spring of 1984. They will meet present needs for office and instructional laboratory space. Planning for needed research space includes an expansion of the new facilities. This subject is also discussed in Section 5.6, Working Conditions.

8.2 Provisions

The department was given the opportunity to provide input as to the laboratories in the new facilities. Allocated space in the new building was designed at the department level. Planning was reviewed at departmental meetings.

9. Special Activities

9.1 Type of Special Activities

The EECS department presents short courses, sponsored credit institutes, workshops and other activities. Please see Section 3.1.

9.2 Organization and Funding

The organization structure and funding of the Industrial Affiliates and Associates programs are on file in the EECS Department.

9.3 Academics

The above programs adhere to University policies guidelines in terms of faculty, admissions, instruction, testing and credits awarded.

10. Graduate Programs

10.1 History and Need

The MSE and MS graduate programs were authorized in 1972 and the Ph.D. program in 1983. The graduate programs provide advanced instruction and opportunities for research to full time and part time students. The EECS programs support local, statewide (FEEDS), and national needs in the important and critical area of Electrical Engineering. The MSE and MS programs support a large number of students, course enrollments are very high. Graduates of the programs do very well in industry. At present there are two doctoral candidates, four doctoral students, and a number of post master's students in the Ph.D. program.

10.2 Faculty

Faculty are appointed to the Graduate Faculty on the basis of performance in the Master's programs and research and creative activities. No special considerations are given for teaching graduate courses and minimal release time is given for directing student research. The latter situation is in need of immediate attention, especially as regards the Ph.D. program. At the

departmental level, Ph.D. advisors are provided the opportunity to teach special topics courses in areas critical to the Ph.D. program. With increasing enrollments in the bachelor's and master's programs these opportunities are becoming less possible.

10.3 Students

Graduate students are selected on the basis of previous academic performance and Graduate Record Examination (GRE) results. Master's students are directed to contact faculty who are active in research in the student's area of interest. Once a student has been assigned to a faculty advisor, a program of study and a research report or thesis committee is appointed by the Department Chairman. Faculty and student input is used in program of study and committee appointment decisions. Guidelines for the program of study for both the MSE and MS programs can be found in the Graduate catalog. Attention needs to be given to articulation requirements for the MS program. Due to the large number of laboratories and the high course enrollments, there have been very few opportunities to provide any opportunities other than grading and laboratory assistance experiences. A typical assignment for a half-time graduate teaching assistant is grading and assisting in three laboratory sections, each with an average enrollment of 25. Post-master's and doctoral students and, recently, selected master's students are being given full responsibility for laboratories. There is a need for a formal training program in addition to University-wide programs for EECS graduate assistants.

10.4 Instruction

All of the graduate courses, with the exception of doctoral-level special topics courses, are video taped and made available at the Residence Centers and other locations. This special instructional technique serves students and industry in the state who otherwise may not be able to obtain graduate education. However, it poses constraints on the mode of instruction. It also leads to very large class sizes, and administrative difficulties. It benefits the part-time student, many times at the expense of the full-time student. Attention should be given to class size limits and the absence of laboratory and library experiences.

10.5 Library

Special library resources are needed, especially in regard to the Ph.D. program. These resources have not been identified as yet.

10.6 Financial Resources

The graduate programs are supported by both E&G and Contract and Grant (C&G) monies. In the latter case, Graduate Teaching Assistantships are largely a result of salary dollars displaced by externally-funded, or EIES funded, faculty release time. The Graduate Research Assistants are funded directly by faculty research contracts or grants.

10.7 Graduate Enrollment

	<u>1981-82</u>			<u>1982-83</u>			<u>1983-84</u>	
	F	Sp	Su	F	Sp	Su	F	Sp
EEL5173	23		20	35			26	
EEL5365	35			48			74	50
EEL5441	7			13			28	
EEL5442			24		40			
EEL5505*	14							
EEL5563						14		
EEL5630		16			13			11
EEL5907	1	2	2			3		1
EEL5937		19	15		8			16
EEL6144			14					
EEL6349		39			12			32
EEL6371	12			22			22	
EEL6372		23			13			24
EEL6488			7			19		
EEL6502		11			23			13
EEL6504					14			18
EEL6505						12		
EEL6530	11			21			23	
EEL6560		6			21			13
EEL6561			9			16		
EEL6565								5
EEL6671				7				
EEL6717		8						
EEL6908	1	6	1		6	8	2	2
EEL6938			1				4	
EEL6918	7	16	15	18	8	10	13	12
EEL6971	8	6	7	5	10	7	12	9
EEL7980								2
TOTAL	—	—		—	—	—	—	—
ENROLLMENT	119	168		169	168	89	204	203

Graduate Course Enrollments*

Table 10.7

*semester system

11. Research

11.1 Administration

Research is encouraged at both the college level and the departmental level. The primary mechanism at the college level is the use of Engineering and Industrial Experiment Station (EIES) funds to support "seed" research. Although projects are funded on a competitive basis (college-wide), departmental level input (chairman's comments) is solicited and used. The college also provides travel and equipment funds on a case by case basis. Funds for equipment for research (and for advanced teaching) are generally not available under the present guidelines for allocating departmental OCO (see Sec. 4.4).

Space is also presently not available. Secretarial support is generally available. The only release time associated with research is externally funded release time.

There is no formal departmental mechanism for evaluating the quality of research associated with research contracts. Faculty performance in the area of research and creative activities, which includes publications, is evaluated by the chairman as part of the annual performance evaluation. Faculty who do not have funded research are also expected to have activity in this area. The College guidelines for evaluation are used at the departmental level. The formal reward associated with research is a good evaluation which is used in determining merit raises and good progress toward promotion and

tenure. The informal reward for funded research is release time to meet the expectations for research which to many faculty does not appear to be a function of formally assigned release time.

Individuals with records of continued funded research have been given the opportunity (EIES funds) to write proposals and other publications which would lead to advanced levels of funding. Research is perceived by many of the faculty to be the major determining factor in tenure, promotion and salary increases.

Current research and teaching expectations are having a negative effect on faculty morale.

The chairman's leadership role in the area of research has been to provide an environment which encourages research. In the past, the internal activities have included counseling of the identification of opportunities, and active lobbying and endorsement for funds available at the college level. The external activities included meeting with local industry and government laboratories for the purpose of presenting faculty interests and capabilities.

The role of the chairman should be expanded. At present this effort is centralized at the college level.

11.2 Funding

	<u>1979-80</u>	<u>1980-81</u>	<u>1981-82</u>	<u>1982-83</u>
Funding Level	\$218,653	\$235,596	\$462,994	\$415,669

EECS Research Funding

Table 11.2

The amount of funding by EIES has increased and from external sources has increased over the period 1979-1982.

The capacity for research is decreasing as enrollments rise. It is expected that the amount of research will also decrease.

11.3 SpaceEECS Teaching Laboratory Space

EGN CORE Laboratory	1200 sq. ft.
EECS Option Laboratory	1532 sq. ft.

EECS Research Laboratory Space

Research	856 sq. ft.
Research and Teaching	500 sq. ft.

Total 4188 sq. ft.

Space Devoted to Instructional and Research Laboratory Activities

Table 11.3

There is no space which is exclusively for faculty research. It is projected that space for shared faculty research and teaching will increase with the opening of the new building in Spring 1985. Other space is being requested in the proposals for CEBA expansion.

11.4 Future Development

Research development can be balanced with teaching if steps are taken to correct a student faculty ratio which limits the time faculty can devote to proposal writing and other non-sponsored research and creative activities.

A present effort to encourage symbiotic faculty research is the development of the Solid State Devices Laboratory (SSDL). Four faculty and their graduate students meet weekly to discuss current and planned activities and track progress on laboratory related projects. Dr. Malocha initiated and administers this effort. Other research programs are relatively independent efforts. The Department Chairman influences and provides encouragement for efforts which support the instruction and personnel development goals of the department.

12. Summer Terms

12.1 Courses

Courses for the summer term are selected on the basis of greatest

student need and anticipated loading in the fall semester. The department offers all courses which are the department's responsibility in the college CORE program. In addition, it offers a course used by computer science majors (EEL3341C) and a course required in both the EECS and EMCS program (EEL4342C). The latter is a prerequisite course for the heavily enrolled digital systems course sequence which begins in the fall semester. Recently EEL3370C has been offered because of uneven fall and spring enrollment patterns. The graduate offerings consist of courses which are not part of regular sequences but are critical elements in the graduate program (EEL6144, EEL 6488) and the third course of three course sequences EEL6717, EEL6505, and EEL6561, EEL 5563 are also regularly offered. The latter is the only course which will satisfy the EECS technical elective requirement. Because of student demand the technical elective EEL4701C will also be offered in the summer semester.

There is a need to offer more undergraduate technical electives in the summer semester. Many students who anticipate graduation in the spring semester but are not able to obtain technical electives have difficulty completing this degree requirement in the summer semester.

12.2 Faculty

Faculty are selected, at the college level, for the summer term on the basis of externally funded release time they obtained in previous years and on previous non-externally funded summer

appointments. The College allocates a limited number of positions on the basis of departmental instructional needs. There has been very few, if any, cases where faculty who desire summer positions have not been offered summer positions on the basis of departmental instructional needs.

12.3 Funding

In addition to Education and General (E&G) monies and EIES monies (see Section 11.2), externally funded research contract monies provide for faculty summer appointments.

12.4 Schedule

The summer schedule is similar to the fall and spring schedules with the exception of four class meetings per week for a three contact hour lecture course (the department offers all courses with the possible exception of EEL3341C, as C term courses). Activities other than instruction and funded research are not supported during the summer term. This poses a difficulty in terms of recognizing committee and service activities which must be continued with or without support.

12.5 Students

The student mix for the summer term does not differ significantly from the student mix in the fall and spring terms. Students are

advised of the types of offerings and generally use the summer semester to satisfy CORE requirements. Students must satisfy University requirements for summer attendance.

13. Computers

13.1 Impact and Needs

The use of computers in the profession of electrical engineering is increasing at an exponential rate. Electrical engineering education is being challenged to provide the necessary education and training in this important area. In addition, computers offer an opportunity for improving the quality of education. Recent acquisitions have provided a basis for progress in this area. Faculty have access to computing facilities for the purpose of adding computer-oriented exercises to the present courses. However, a major difficulty is the lack of release time for development and the availability of technical support staff for this effort. Student access to computers has also improved as has access for both student and faculty research and thesis efforts.

Five and ten year plans need to be developed at the departmental level. Recent changes in the way the State of Florida administers computing resources will provide impetus for planning in this area.

14. The Brevard, Daytona and South Orlando Centers

14.1 Courses

All graduate courses offered by the EECS Department are available at all of the Centers via video tape. Live courses are offered at the South Orlando Center on the basis of student enrollment at the Center and availability of studio facilities at UCF. Dr. Harden, the South Orlando Center Director, has tenure in the Department and regularly serves on and leads thesis and research committees. Dr. Harden provides both counseling and administrative support at the South Orlando Center. Administrative support at the Brevard Center has recently been improved as a result of the increased presence of the College of Engineering. There is general administration support at the Daytona Center. There is no graduate counseling support at either the Brevard or the Daytona Centers. Students are encouraged to seek counseling through Dr. Mathews' Office (College-level graduate counseling) or through the departmental office. There is minimal coursework, administrative support or counseling for the undergraduate program at the Brevard and Daytona Centers.

14.2 Faculty

Faculty who teach at the South Orlando Center are selected on the basis of expertise in coursework which is offered at the Center. Office hours are not regularly scheduled at the Centers. The coursework is graduate coursework and assistance is offered by either appointment or by other means.

14.3 Funding

Faculty who teach at the Orlando Center are reimbursed for travel costs. Faculty who instruct via video tape are assigned nominal "effective" contact hours for off-campus sections.

14.4 Facilities and Library

The availability and adequacy of facilities at the Centers for video tape instruction is acceptable. The library services are not acceptable. This is due primarily to the lack of funding for textbooks and journals which should be available for graduate instruction of the level offered. Faculty attention to this matter has also been a difficulty.

15. Media

All graduate coursework is available via video tape. The mode of operation is such that video tape is used to record instruction at a "live" site and it is presented only once at the remote locations. Proprietary rights have not been considered since the present policy does not provide for saving or copying the video tapes. If the present policy is changed, the issue of proprietary rights should be investigated. Expansion of the use of media should consider the added workload on faculty and guidelines addressing release time should be developed.