1985

University of Central Florida 1985 Self Study Southern Association of Colleges and Schools: Department of Mechanical Engineering and Aerospace Sciences Self Study

University of Central Florida. Mechanical Engineering and Aerospace Sciences

UNIVERSITY OF CENTRAL FLORIDA

1985
Self Study

SOUTHERN ASSOCIATION OF COLLEGES AND SCHOOLS

DEPARTMENT OF MECHANICAL ENGINEERING AND
AEROSPACE SCIENCES

SELF STUDY REPORT

UNIVERSITY OF CENTRAL FLORIDA

SELF STUDY REPORT

DEPARTMENT OF

MECHANICAL ENGINEERING AND AEROSPACE SCIENCES

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With contributions from
other MEAS faculty members

February 8, 1984

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MECHANICAL ENGINEERING AND AEROSPACE SCIENCES

SELF STUDY REPORT

1.0 PHILOSOPHY

1.1 Role in the University and the Community

The Mechanical Engineering and Aerospace Sciences (MEAS) Department, as one of five engineering departments of the University of Central Florida, provides professional education in a field of large demand in the present era of high technology. Florida, and Central Florida in particular, is experiencing a high and growing demand for engineers, particularly electrical and mechanical engineers. The BSE, MSE and Ph.D. programs in Mechanical Engineering are growing to meet this demand although hampered by insufficient faculty, facilities and funding. Industries, as witnessed by the new Westinghouse facility and the development of the UCF Research Park, are locating in the immediate vicinity of UCF, largely because of the Engineering College. A number of mechanical engineering students, particularly at the graduate level, are derived from these industries.

Because of the highly specialized nature of mechanical engineering, and because there is no engineering general education requirement, not very much direct service is provided to the rest of the University. However, the Department does Participate in offering EGN 4824, Engineering & Society, and EGN

4033, Technology and Social Change, as upper level General Education Program courses. Students in the Physical Sciences and Mathematics areas can take courses in the engineering core, many of which are taught by the MEAS Department. The engineering curricula have strong core programs and approximately fifty percent of these courses are taught by the MEAS Department. The MEAS Department is engaged in engineering research and this activity benefits local and regional industries and businesses. The publications and knowledge generated by this research reflects well on the University as a whole. The MEAS faculty participate in local, regional and national professional societies. In addition, faculty members participate in workshops and seminars for local industries, etc. They give talks to clubs and participate in the School ADDITIONS and DIVIDENDS Programs. There is faculty representation in professional societies such as American Society for Engineering Education, American Society of Mechanical Engineers, American Institute of Chemical Engineers, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Society of Automotive Engineers, American Institute of Aeronautics and Astronautics, American Society for Testing and Materials, American Society for Metals and American Nuclear Society.

1.2 Evaluation and Projections

Industry is rapidly expanding in the Central Florida area and the demand for mechanical engineers is growing accordingly. It is anticipated that the number of BSE mechanical engineering graduates will have to quadruple in the next ten years. In that

same period there will be an explosive demand for graduates with MSE and Ph.D. degrees.

This growth will require two or three times the number of present faculty, several times the laboratory and computer facilities, and a large commitment of additional resources.. Faculty specialists in controls, robotics, CAD/CAM, materials engineering and biomechanics will need to be hired to meet industry needs. Reassessment of FTE allowance for the graduate program will be necessary. As the departmental programs grow there will have to be less central college control and more delegation of responsibility and authority to the individual departments. Definitely more offices, classroom and laboratory space and library resources will be needed to meet the program requirements.

2.0 ORGANIZATION

2.1 Duties and Staffing

The MEAS Department is headed by a chairman who is selected by the President on advice by the Dean. The organization and duties in the Department reflect the policies and procedures of the Dean. The Chairman is .5 FTE administrator and .5 FTE faculty. At present, the MEAS Department has 17 regular faculty members, 4 full professors, 7 associate professors, 3 assistant professors and 3 instructors with 1 associate professor on leave. Most of the faculty in the professorial ranks teach core, major and graduate courses. The Chairman is the chief administrative officer of the Department although the Dean maintains strong central control of the College and oversees and governs hiring

and firing, salary raises, major budget allocations, and other such administrative matters. The faculty teach, do research, perform service activities, and advise students. Approximately 13 graduate assistants are employed half-time in the Department, five on funded research projects and the rest presently working as teaching assistants or paper graders. More sponsored research is needed to support the graduate students. Graduate Assistant pay ranges from $7.25 per hour to $12.00 per hour depending on degree status and course completion toward degree.

The MEAS Department has two full-time secretaries and one part-time student assistant clerk. The student clerk is paid from OPS while the secretaries are career service and are paid according to grade and time of service (see Sec. III and Sec. IV). Both secretaries answer to the department chairman directly but provide services to the Department as a whole. Secretarial pay is not controlled by UCF and is very poor. Secretaries are responsible for keeping the Department purchasing and OPS records, student records, processing forms, and doing academic and research typing. No technical support personnel are assigned directly to the Department but are instead administered and assigned by the Associate Dean.

The faculty are evaluated annually by the chairman with oversight provided by the Dean. Pay is determined by rank, time in service and merit. The faculty base pay raise amount is fixed by union contract and the merit pay is fixed by the Dean. Hiring of new faculty is generally planned by the Chairman to meet department needs but allocations of positions are determined by

the Dean. adjuncts are hired to meet some day and evening course needs and these are hired by the Chairman with the approval of the Dean. All faculty contracts are written by the Vice-President for Academic Affairs on advice of the Dean. Because of anticipated growth in the future, the Chairman's position probably will be full-time with the addition of a part-time assistant chairman. More faculty will probably be added and will be relieved of some committee work and undergraduate advisement by the assistant chairman who will accomplish a larger share of these tasks. The Dean will need to delegate control of department level hiring and firing, evaluations, raises, assignment of technicians, decisions on the budget, etc. Faculty LOADS will have to be reduced to do justice to the MSE and Ph.D. teaching and research programs. Faculty pay will have to meet or exceed the national average and compete with industry. More support staff with better pay will be needed. More graduate assistants will have to be used in undergraduate teaching and laboratories. More industry cooperative education opportunities and financial support will be sought.

2.2 Support and Communications

The strong centralized control by the Dean offers some services to the Department such as coordination of core course offerings through an assistant dean, centralized shop facilities, and possible coordination and concentration of the college mission. However, this extent of central control and decision-making is inhibitive in other ways. Pure program size dictates that the authority and responsibility be decentralized

to enhance professional program development, particularly in specialized areas of the MSE and Ph.D. programs. More equitable treatment can be applied to individual faculty, and then a more cooperative effort can be achieved through a closer alliance with a chairman with evaluative authority. Communication with students is good because of contact of faculty with students at all levels and participation in the student chapters of the professional societies.

2.3 Projections

The MEAS Department anticipates broad utilization of regular committees to develop undergraduate and graduate programs, laboratory and equipment requirements, computer utilization and research, and design. Such committees also will address curricular issues identified by the Accreditation Board for Engineering and Technology (ABET).

3.0 EDUCATIONAL PROGRAM

3.1 Correlation of Program and Objectives

A central goal of the MEAS Department is to produce well qualified, competent graduates by providing those educational opportunities which are requisite for making effective contributions to society. More specifically, the objectives are: to educate the student to think for himself, logically, and to gather and organize information required to make decisions in the solution of open-ended problems; to assist the student in developing a value system which includes a concern for economics, ethics, esthetics and the environment; to provide professional

experiences in the mechanical engineering discipline and to provide experience in working as part of a team in solving open-ended problems; to require the student to demonstrate competency in oral and written communication; to ensure that the student demonstrates knowledge of the application and use of digital computation techniques; and to provide appropriate laboratory experience. Further, the specific objectives above are to be applied to both the mechanical systems and thermal systems areas.

The Accreditation Board for Engineering and Technology (ABET), has, in its Criteria for Accreditation, explicitly stated that the course work should include approximately:

1. One half year of mathematics beyond trigonometry.
2. One half year of basic science.
3. One year of engineering science.
4. One half year of design.
5. One half year of humanities and social science.

Figure A delineates the MEAS curriculum and indicates how the above requirements are met. Electives in the option are restricted to any course offered by the Department or upper division mathematics courses. Exceptions to this require written approval of the advisor and Department Chairman.

3.2 Admissions

University admissions policies have, in principle, no effect on the meeting of department goals. Prior to enrolling in courses at the professional level, each student must receive approval from the office of the Dean of Engineering and secure

CATALOG 1983-84

UNIVERSITY OF CENTRAL FLORIDA
DEGREE REQUIREMENT CERTIFICATION

COLLEGE OF ENGINEERING

NAME _____ S.S. # _____ OPTION Mechanical Engineering

ADVISOR _____
DEGREE PROGRAM B.S.E.

GENERAL EDUCATION 49 = (25) + 24
LOWER DIVISION 40 = (16) + 24

Communication 9	Hr	Gr	Tr Equiv
ENC 1101	3		
ENC 1102	3		
SPC 1014	3		
Cultural & Historical 9			
EUH 2000-2001 or AMH 2010-2020 or HUM 2211-2230	3		
	3		
APPROVED ELECTIVE	3		
Mathematical 6 = (6) + 0			
MAC 3311	(in ENGR CORE)		
COP 3215	(in ENGR CORE)		
Social Foundations 9 = 6 + (3)			
ECO 2013	(in ENGR CORE)		
POS 2041	3		
PSY 2013, SYG 2000, or ANT 2003	3		
Science 7 = (7) + 0			
PHY 3421C	(in ENGR CORE)		
Biol/Geol/Phys Geog	(in ENGR CORE)		
SUBTOTAL	24		
UCF Enhancement 9 = (11) + 0			
MAC 3312	(in ENGR CORE)		
MAC 3313	(in ENGR CORE)		
MAP 3302	(in ENGR CORE)		
GPA GEN EDUC =	(2.000 minimum)		

Check if G.E. requirements completed with appropriate A.A. degree.

GEN EDUC _____ SH
ENGR CORE _____ SH
ENGR OPTION _____ SH
TOTAL _____ SH

Florida EI Exam Taken
Date _____

Transfer Credit from Schools Indicated
(1) _____
(2) _____
(3) _____

ENGINEERING CORE	Hr	Gr	Tr Equiv
COP 3215 Comp Prog or EGN 3210 Engr Comp	3		Consult Advisor#
EGN 1111C EngrGraph	2		
ECO 2013 Macroecon	3		
EGN 1380* Chem Engr	4		CHS 1931
EGN 2382* Engr Conc	3		
MAC 3311 Calc/Anal	4		
MAC 3312 Calc/Anal	4		
MAC 3313 Calc/Anal	4		
MAP 3302 Diff Eqns	3		
EGN 3311 Statics	3		
EGN 3321 Dynamics	3		
EGN 3331C Mech Matl	3		
EGN 3383 Elec Sci	3		
EGN 3373 Elec Engr	3		
EGN 3375C ElecDevSys $	3		
EGN 3343 Thermo	3		
EGN 3353C Fluid Mech	3		
EGN 3613 Engr Econ	2		
EGN 4714 Cntrl Sys $	3		
EGN 3363C Materials $	3		
EGN 3704 Engr Env	2		
STA 3032 Prob Stat	3		
PHY 3421C Opt/Mod Phys	4		
BSC 1020C, 1030C, GEO 1200,3370, or GLY 1000	3		
EGN 4634 Oper Res	2		
EGN 4624 Engr Admin	3		
SUBTOTAL	79		
GPA CORE =	(2.250 minimum)		

ENGINEERING OPTION	Hr	Gr	Tr Equv
EML 3106 ME Thermo	3		
EML 3262 Kinematics	3		
EML 3303 Meas Sys	1		
EML 3502 Mach Des	3		
EML 4142 Heat Tran	3		
EML 4222 Vib Anal	3		
EML 4505 Engr Des	3		
EML 4412 ME Lab	1		
SUBTOTAL	29		
GPA MAJOR	(2.250 minimum)		

Graduation Checklist	Req	Comp
Gordon Rule	18	
U.D. Credit	48	
Sr. Inst. Credit	64	
UCF Res. Credit	30	
Summer Credit	10	
Corres/Military Credit)	Max	
Cred by Exam/CLEP)	45	
Total Hours Earned	132	
Cumulative UCF GPA	2.0	
Overall GPA	2.0	
CLAST Date:		

* Requires prior High School Preparation or articulation - See Advisor.

Native UCF students have specific restrictions - See Advisor.

$ Considered part of Mechanical Engineering major.

CERTIFICATION

Advisor _____ date
Dept. Chrm. _____ date
Dean _____ date
Degree Awarded _____ date
Registrar _____

-/A-

from his/her advisor an approved course of study for remaining work. The above policy, however, is not enforced. If it were, it would relieve the faculty of the burden of dealing repeatedly with poorly performing students who have no chance for graduation. There are no special programs for honor students or for students on academic probation or warning. Transfer students from the community colleges merge into the program with no noticeable difficulty.

3.3 Enrollment

The following table indicates the fall enrollment of undergraduate students in the MEAS Department.

NUMBER OF MAJORS AND DEGREES AWARDED

YEAR	78-79	79-80	80-81	81-82	82-83
No. Majors	231	272	326	337	392
Degrees Awarded	25	32	38	35	65

There are several College level student recruitment activities coordinated with the UCF Office of High School and Community Relations. Special efforts are made to recruit minority and female students. The MEAS Department strongly supports these efforts and participates in recruitment programs and outreach activities wherever possible.

Undergraduate enrollment is generally too high for maximal effectiveness in engineering courses, a point criticized by ABET. All students are expected to fulfill the formal mechanical engineering curriculum and no course credit is given for such experiences as intern or cooperative programs.

3.4 Curriculum

There are two major sub-disciplines and one supportive sub-discipline within the MEAS Department. Faculty specially qualified to teach in these sub-disciplines are listed below.

Thermal Systems	Mechanical Systems	Materials Science
Anderson	Hagedoorn	Minardi
Beck	Jenkins	Smith
Bishop	Metwalli (on leave)	
Carpenter	Moslehy	
Chang	Nuckolls	
Eno	Rice	
Gunnerson		
Henry		
Hosler		

The present faculty has sufficient expertise to staff all of the course offerings of the Department. However, in doing so, the faculty is stretched too thinly and is unable to develop depth in particular research areas. More faculty would not necessarily alleviate this problem because of the legal State University System course load requirements.

Nineteen elective courses are offered within the Department. All are interdisciplinary in the sense that students from other engineering departments are welcome to enroll (if they meet the prerequisites). None is intended to fulfill general education requirements.

The Department has a standing curriculum committee, and ad hoc committees are formed periodically to review the course offerings in a specialty area such as design or materials, etc. Course offerings, credits per course and prerequisites are primarily determined by those committees.

Prerequisites cited are only those which are considered to be essential for satisfactory performance in the course; none is used to "control the flow" of students through the curriculum. The prerequisite system is shown in Figure B. Thirty one percent (9/29) of the major program can be taken by restricted electives. No free electives are permitted.

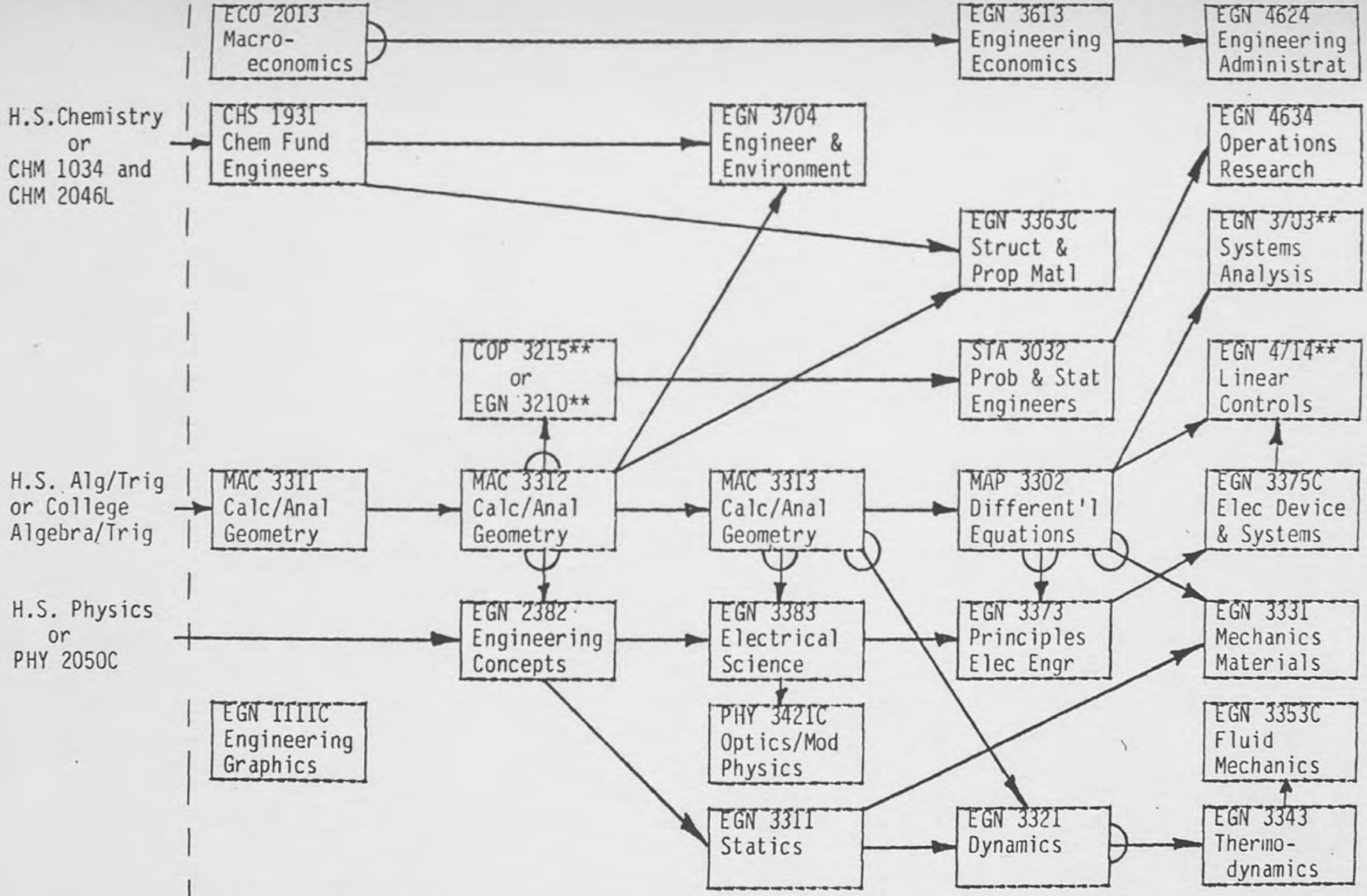
3.5 Instruction

All courses taught in the MEAS Department use syllabi. Courses taught occasionally by adjunct faculty are EGN 1111 Graphics, EGN 3311 Statics, EGN 3321 Dynamics, and EML 3303 Measurements. In recent years Drs. Zalesak, Elias, Fuehrer and Pigott and Mr. Elder have repeated as adjunct faculty.

The Department Chairman, with some oversight by the Dean, evaluates the effectiveness of instruction by the faculty. Normally, his data consist of student written evaluations and individual comments of students. Too much emphasis can be placed on student input, and there is a danger in this because some faculty may feel the need to compromise their standards to secure a good evaluation. Other methods of teacher evaluation should be considered as well.

Teaching improvement is encouraged by the Chairman and, of course, teaching performance is considered in determination of merit pay. Departmental committees on curriculum and related

Articulation



** See Adviser for restrictions

Prerequisite ——→ First course must be taken before second course

Corequisite ⌒→ Second course may be taken along with first course

JPH: 1983-84

matters encourage effective instruction by evaluating and recommending course content.

Following is a tabulated fall term summary of grade distribution history showing the upper division and graduate grades for the course offerings in the department over the last five years. Lower division grades are not shown since students are not normally assigned to the Department until they achieve upper division status.

MEAS DEPARTMENT

PERCENTAGE DISTRIBUTION OF UPPER DIVISION GRADES

FALL

	A	B	C	D	F	WP	I	NO. OF GRADES
1978	23.2	30.5	25.6	4.9	3.6	11.0	1.2	82
1979	13.4	20.5	40.2	15.2	6.2	3.6	0.9	112
1980	19.2	39.1	29.1	4.6	1.7	0.7	4.6	151
1981	14.3	26.1	31.7	11.3	7.4	8.3	0.9	230
1982	23.1	28.0	28.0	9.9	3.2	6.7	1.1	282

PERCENTAGE DISTRIBUTION OF GRADUATE DIVISION GRADES

FALL

	A	B	C	D	F	WP	S	U	I	NO OF GRADES
1978	29.4	35.2	11.8		5.9	11.8		5.9		17
1979	28.1	15.6	6.3	6.3	3.1		6.3		34.3	32
1980	5.9	11.7				5.9	41.2		35.3	17
1981	36.4	15.1	3.0			18.2	21.2		6.1	33
1982	33.3	31.1	2.2			6.7	17.8		8.9	45

3.6 Other Activities

The Department sponsors an MEAS student organization which combines the student chapter activities of the American Society of Mechanical Engineers, the Society of Automotive Engineers, the American Society for Metals and the American Institute for Aeronautics and Astronautics. This group sponsors lectures by practicing engineers on various topics in mechanical engineering. Faculty also discuss aspects of research they are doing.

Lectures on the legal problems associated with engineering and on product and professional liability are held regularly in connection with EML 4505 Engineering Design. A variety of seminars of primary interest to graduate students and faculty has been presented by visiting faculty and faculty candidates. Help sessions and tutoring sessions are held irregularly by individual instructors and in connection with activities of the honorary societies Pi Tau Sigma and Tau Beta Pi.

3.7 Projections (5 years and 10 years)

The departmental mission, currently and as projected into the future, is to conduct teaching, research and service programs of excellence for our students and for our external constituencies. At present, the undergraduate program in Mechanical Engineering is being reviewed by formal and Ad Hoc committees. Accordingly, it is anticipated that the curriculum will benefit from recommendations for modest shifts of emphasis, including both the integration of the computer within the discipline, and the coherence and content of required mechanical engineering laboratory courses. Five years from now, it is

likely that computer-based-instruction and computer-aided-engineering will be utilized in several areas within the undergraduate program, including graphics. In ten years, these trends will doubtless be significantly more pronounced.

At the graduate level, current programs lead to the Master of Science (MS), to the Master of Science in Engineering (MSE), and to the Doctorate (Ph.D). The master's program offers students a choice between specialization in energy systems or in mechanical systems, or in advanced but more generalized, interdisciplinary studies. The doctoral program, newly developed, is intended to prepare highly trained men and women for leadership roles in research, teaching and technological development. In the future, it is possible that additional areas of specialization will be defined for graduate programs. Planning for such programs should be coordinated with college-wide development in Chemical, Computer and Materials Engineering. Depending upon alternative growth scenarios, staffing and enrollment could increase dramatically or modestly. On the low side, a faculty of twenty to twenty four is considered necessary to staff the teaching and research specializations within current and developing areas in mechanical engineering. At present, six major recruitment categories have been defined, and each of these contains several important sub-categories. Concomitant with growth in graduate program areas is the need to increase research productivity. In virtually all cases, attainment of this goal requires external funding, and it therefore follows that efforts to obtain such support be

increased.

Over the past three years, external awards to the department have been $136,868 in 1980-81; $131,626 in 1981-82; and $108,745 in 1982-83. Within the next five years, annual external support for research should increase to $500,000.

Growth in staffing and in research productivity will doubtless be accomplished by increased activity in other areas. Accordingly, faculty would anticipate more interaction with colleagues in industry and in other academic departments. In addition, commitments to professional society activities, to student organizations, and to alumni must be strengthened.

4.0 FINANCIAL RESOURCES

4.1 Outside Funding

In this Department, external funding consists entirely of support from outside agencies for research projects. During Academic Year 1982-83, the following were active:

1. Title: A Mathematical Model for Estimating Transient Pressure Surges in a Cryogenic Liquid-Vapor System.
   Sponsoring Agency: National Aeronautics and Space Administration.

2. Title: Analyses of Visual Data from Steam Generator Studies.
   Sponsoring Agency: Electric Power Research Institute

3. Title: Flow Visualization in Feedwater Heaters
   Sponsoring Agency: Westinghouse Corporation, Steam Turbine-Generator Division.

4. Title: Effect of Drain Shield Size on Flow Characteristics in Feedwater Heaters
   Sponsoring Agency: Westinghouse Corporation, Steam Turbine-Generator Division.

During the 1981-82 Academic Year, the following were active:

1. Title: Critical Heat Flux
   Sponsoring Agency: EG&G, Idaho

2. Title: Heat Flux Mapping
   Sponsoring Agency: EG&G, Idaho

3. Title: Steam Generator
   Sponsoring Agency: Electric Power Research Institute

4. Title: Impact Resistance of Concrete Slabs
   Sponsoring Agency: National Bureau of Standards

5. Title: Conical Shock Tube
   Sponsoring Agency: Naval Research Laboratory

6. Title: Crashworthiness
   Sponsoring Agency: Federal Aviation Administration

In each of the above activities, the principal investigator, who is a member of the departmental faculty, is responsible for disbursing the funds. The Division of Sponsored Research, Graduate Studies and Research, assists in developing the contractual arrangements for the execution of the research. Both the Department Chair and the Dean of the College of Engineering approve expenditure of funds but the principal investigator originates all requests. The Division of Finance and Accounting acts as a receiving agent for funds, maintains records of charges to the research contract, and makes financial reports to the sponsoring agency as required.

Discontinuance of research sponsorships by outside agencies would seriously impair faculty and graduate student research activities. Most of the projects cited above support thesis work by graduate students. Since these funds do not support instructional activity directly, their discontinuance would not

immediately affect the courses offered. However, the quality of advanced courses would decline if ongoing research were not being pursued.

4.2 Auxiliary Activities

The Department is not involved in auxiliary activities.

4.3 Budgets

Using an allocation formula which is based on student credit hours produced in the previous year, the University assigns funds for Expense, Operating Capital Outlay, Other Personnel Services, and for a specific number of academic positions to the various colleges. The budgeting and allocation of these funds is done at the College level. Individual academic departments have a limited amount of input in this process. Once funds are allocated to the Departments, the Department Chairman with advice from faculty committees is responsible for their disbursement. For Operating Capital Outlay funds, a budget is prepared and approved by the Dean before funds are expended.

In general, funds are fairly allocated to Departments in the College of Engineering with adequate recognition of specialized needs of the individual Departments. However, the limited amount of faculty involvement in the process may lead some individuals to question the fairness of what is done. Giving the faculty more information on the allocation would be an improvement.

4.4 Equipment

Some mention has already been made of Operating Capital Outlay funding. The College of Engineering has been particularly

fortunate in the last two academic years in that special funding was made available by the Legislature. Consequently this Department had roughly $330,000 in 1982-83 and $247,000 in 1983-84 for capital equipment acquisition.

The elevated levels of Operating Capital Outlay funding have been used to update undergraduate laboratories in fluid mechanics, mechanics of materials, and measurements. In addition, there has been a particular effort to improve departmental research capabilities in selected areas. Examples of this are in vibration analysis, experimental stress analysis, two phase flow measurements, and multi-channel data logging and analysis.

Purchase regulations appear to offer no effective limitation on the acquisition of particular equipment judged to be necessary. Although all large (or expensive) pieces of equipment must go out for bids, this procedure has not led to compromises in equipment quality.

All equipment purchased to date is in regular use.

5.0 FACULTY

5.1 Recruitment and Selection

Procedures used in the MEAS Department for faculty recruitment are specified by the Dean. Positions allocated to engineering are split among the departments. Once full time openings exist in the Department, the Chairman advertises in national journals and magazines as well as placing the position description in the state faculty applicant pool. candidates are

first screened by the Chairman and then, with approval of the Dean, invited to interview. Each interviewee meets with the MEAS faculty in groups or individually and with MEAS chairman, the Dean and other College administrators. All interviewers are asked to provide written comments to the chairman who makes a recommendation to the Dean. If the Dean approves the appointment, he forwards it to the Provost through the Affirmative Action Office. Emphasis for selection is based upon academic and experience credentials as these fit department needs. The Ph.D. is usually required and achievement of the professional engineer's license is expected within 2 years of hiring. There are relatively few blacks and women qualified for faculty positions in engineering but, in compliance with Affirmative Action directives, every effort is made to recruit such minority candidates.

Adjunct faculty are hired to teach individual courses on a semester basis. These are recruited from local industry and in general meet the same standards as the full time faculty. The need for adjuncts exists because of the continued growth of engineering, lack of allocated positions, and unfilled positions resulting from the difficulty of recruiting and competing with industry. Less than 10 per cent of the department teaching is done by adjuncts.

5.2 Organization, Preparation and Growth

Two major sub-disciplines, Mechanical Systems and Thermal Systems, exist within the MEAS Department. Materials Science is another sub-discipline within the department but is not staffed as heavily as the other two.

The thermal systems area is supported by seven faculty in the professorial ranks, one full professor, four associate professors, and two assistant professors. All but one of these has the Ph.D. in Mechanical Engineering or a closely allied field such as Chemical Engineering, Nuclear Engineering, or Physics. The seventh faculty member has a Masters degree in Mechanical Engineering. This group of professors has had an average of approximately 9 years professional experience and an average of approximately 9 years of related industrial experience. All have performed research and published papers pertinent to their specific disciplines. Each of them has taught courses at undergraduate and graduate levels and is prepared to lead efforts and lend support to the fledgling Ph.D. program. Two additional faculty members have MS degrees with background and emphasis in Thermal Systems and hold the rank of Instructor in the department. One of these is a Ph.D. candidate in the department.

The mechanical systems area is presently supported by five faculty members including the Department Chairman. Two of these are full professors, two are associate professors, and one is an assistant professor. All five of these faculty hold the Ph.D. in Mechanical Engineering or Engineering Mechanics. They average about 13 years in college teaching and otherwise average about 5 years of pertinent industrial experience. All of these five faculty members have engaged in considerable research and written a number of technical papers. All five of these faculty members have participated in the undergraduate and graduate programs and

are providing leadership and support for the Ph.D. program.

The materials science area is not so much a distinct sub-discipline within the department but is supportive of the mechanical and thermal systems disciplines. The lead professor in this area has a Sc.D. in the field, has taught college for 16 years, and has 9 years of pertinent industrial experience. He has performed research and is presently writing his second textbook in the materials science field. This professor is supported in the materials science area by an instructor who is presently a Ph.D. candidate. A couple of the faculty identified in the mechanical systems area complement the materials science area closely because of their interest in mechanics of materials.

Professional growth of the faculty is highly encouraged and is supported by travel funds to attend short courses and seminars. Participation in professional societies and attendance of technical meetings is likewise encouraged. The professional engineer's license is required of all the faculty within two years of employment in the College. Recent faculty additions have been hired for their potential to be leaders in the graduate program and research. In general, these growth activities are recognized in annual evaluations.

5.3 Salaries

Faculty salaries are determined by the Dean of Engineering. He has established guidelines which take into account rank, importance to program, and performance. Within ranks an attempt is made to achieve an average salary equivalent to that for engineers published in the Oklahoma Salary Study. However,

present salaries still lag the national average. Salary raises comply with collective bargaining agreements with respect to "across-the-board" increases. The balance is considered discretionary and is applied in amounts commensurate with allowable half-step increments. Although faculty annual reports and chairman's evaluations are taken into account raises are at the discretion of the Dean resulting in some instances of perceived inequity within the Department and between departments.

5.4 Teaching Loads

In compliance with state requirements, all faculty members are required to have a minimum of 12 contact hours in the classroom. However, in engineering, some relief from this requirement occurs depending on funded research, committee assignments, and professional activities. The chairman, with help from the Assistant Dean who schedules college core courses, assigns faculty to teach within their areas of interest. Faculty are encouraged to teach graduate courses. However, FTE allowance for a graduate course is not really sufficient to account for the extra work required. Class size generally has not been taken into account in teaching assignments. Large classes tend to discourage faculty from personal attention to the students, including collecting and marking homework and quizzes and encouraging dialogue in the classroom. Classes of 50 students often exist in the core and option classes and these are too large for the nature of engineering courses. However, OPS funds are usually provided to support student assistants in the undergraduate courses.

Laboratory courses are assigned to both professional faculty and graduate assistants. The laboratories are generally over-populated because of lack of physical facilities. Assignments are usually fair and equitable although FTE assignments for lecture classes are not usually much greater than for laboratory classes.

5.5 Evaluation, Security and Promotion

The policies and procedures relating to tenure and promotion are subject to the overall rules of the Board of Regents and the University of Central Florida as published in Chapters 6C5 and 6C7. The procedure followed in the College of Engineering have been designed by the Dean of Engineering and differs little for tenure and promotion. Applicants for promotion or tenure prepare appropriate supporting materials in a prescribed format. The nomination process is then initiated by the chairman within a department. A department evaluation committee, consisting of tenure and tenure-earning faculty members, is elected within a department. In practice, this has included all tenured members and, in some years two or more tenure-earning members, excluding candidates for promotion or tenure. This committee is expected to review the application materials of the candidate, survey other faculty members, meet to discuss the candidate's credentials, and vote on the candidate's promotion or tenure. The evaluation of the candidate's credentials is intended to judge the quality and quantity of performance in teaching, research and service activities.

Following the department evaluation committee's vote the

Department Chairman makes his recommendation to the Dean. The candidate's promotion or tenure file is then reviewed and judged by the College Personnel Committee, then by the Dean who makes his recommendation, followed by the University Personnel Committee, the Vice-President for Academic Affairs, and the President. One addition to this procedure occurs in the tenure process and that is, following the College Personnel Committee action, a vote of all tenured faculty members in the College is solicited by the Dean.

There are several things that are inherently weak in the tenure and promotion process. First, there is a strong tendency for succeeding committees not to take their charge seriously enough and to simply rubber stamp the actions of the department evaluation committee, Department Chairman, and college dean. Second, a candidate for promotion and tenure has been allowed to sit on the College Personnel Committee to evaluate all applications except his or her own. Finally, the college-wide vote of tenured faculty on a tenure application can be criticized because most of these electors do not review the candidate's file nor, within a college with 90 faculty members, do they necessarily even know the candidate. The UCF rule requiring a vote of all the tenured faculty members of the department or unit should pertain only to the candidate's department.

5.6 Working Conditions

The College of Engineering, including the MEAS Department, has grown very rapidly in its relatively short history and yet facilities to accommodate the College have not changed substan-

tially. This should be alleviated to some extent when Engineering moves into a new building in another year. In the meantime, faculty offices are small and crowded, classrooms are crowded to the point of inviting cheating on exams, and laboratory space is extremely limited. The lack of office and laboratory space was a major criticism levied by the Accreditation Board for Engineering and Technology in their last accreditation visit three years ago. The situation has only become worse since then.

There is never enough funding available to accommodate the needed equipment for undergraduate instruction. Even if there were enough funding, space limitations would preclude the use of such equipment. Actually, the equipment funding situation has improved measurably in the last few years, but a lot of catch-up is needed. It is anticipated that a fairly substantial amount of funding will be available to assist in equipping the new engineering building.

The space and equipment limitations are even more severe when considering a viable research program. Most research equipment is derived from external research contracts or grants and more of this type of effort is needed; however, a truly viable research facility requires an investment on the part of the State University System. As it stands now, because of the lack of secure research space and equipment, faculty are discouraged from engaging in experimental projects.

Scheduling of classes is largely dictated by the crowded conditions and, as a consequence, is accomplished with utmost

efficiency. Individual faculty members generally have fair schedules which permit them to be efficient in their work.

5.7 Projections

It is expected that the MEAS Department will continue to grow, thus requiring more faculty, support staff and facilities. The student/faculty ratio remains quite high and thus there is a need to add more faculty. Efforts continue presently to recruit even though it is difficult in an atmosphere favoring high employment and high salary opportunities for Ph.D. engineers. Support personnel, especially secretaries, are overworked and underpaid. As more industry moves into the area, it is going to be more and more difficult to retain qualified secretaries and technicians, and therefore, something must be done to improve their lot.

In light of the above discussion it is obvious that a great deal of improvement is needed in terms of laboratory space and equipment. The new engineering building will give some relief to this problem, but it is anticipated that these new facilities will be outgrown in a few years. Much long range planning needs to be done.

6.0 LIBRARY

6.1 Collections

The library collections are considered adequate for the undergraduate mechanical engineering curriculum. Basic text and reference materials are available to meet the student and faculty needs on the undergraduate level.

For the near and long term development efforts, the UCF library is considered marginal for graduate level research and development. To meet the departmental needs for a quality Ph.D. program, major changes in the technical holdings are required. Quality Ph.D. research in engineering demands a comprehensive technical library. This would require several changes in the present library structure including:

1. A broader base of technical journals, up-to-date, with all or most back issues.
2. The automatic acquisition of technical society proceedings, including those from ASME, AIAA, and AIChE topical meetings.
3. An expanded collection of national laboratory and government publications.
4. A full-time, highly qualified, technical librarian to assist students and faculty.
5. A substantially speedier interlibrary loan process (presently, acquisition takes 4-6 weeks).

6.2. Coordination

The MEAS Department coordinates its efforts with the library staff via representatives from the College of Engineering (COE) Library Committee. Faculty request that new issues be purchased by contacting their respective COE Library Committee representative. This procedure continues to work well.

6.3 Services and Facilities

As described in Section 6.1, the library facilities and services meet the MEAS needs for the undergraduate curriculum,

however, they are marginal for the graduate program. Suggestions for library modifications were provided.

Computer search services, such as offered by the library or by the COE STAC facilities, greatly aid the research capabilities. Such services, however, are integrally linked with the slow interlibrary loan service.

An assessment of the library facilities and services at Brevard, Daytona and South Orlando Centers has not been made.

7.0 STUDENT DEVELOPMENT SERVICES

7.1 Student Mix

Students registered in Mechanical Engineering for the Fall 1983 semester are categorized as follows:

	WHITE		BLACK		HISPANIC		OTHER		INTERNATIONAL	
	M	F	M	F	M	F	M	F	M	F
Lower Div.	60	14	0	0	4	2	1	1	0	0
Upper Div.	222	20	1	0	5	0	8	1	21	1
Graduate	29	5	2	1	0	0	1	0	12	0

7.2 Advising

Each MEAS student is assigned a faculty advisor as he or she enters the Department. The advisor assists the student by monitoring his or her progress, assuring that the student follows the proper sequence of courses, helping the student to prepare a petition for transfer of course credits earned elsewhere, and checking to see if they meet all requirements for graduation.

During the latter part of each academic semester a week is selected during which the students can retrieve their trial and advisement schedules from the department and receive formal schedule advisement. Many students elect to be self-advised and,

in some instances, overlook proper requirements and place themselves in jeopardy relative to timely course completion and graduation.

Students are admitted to the Department as freshman and as transfer students from Community Colleges or other four-year Universities. They are formally classified as juniors if they have completed 52 credit hours even though they may not have completed some freshmen and sophomore level coursework in mathematics and engineering sciences. There exists a requirement that the Dean must approve each admission to the upper level program in engineering although this formal approval has not been practiced.

7.3 Organizations

The following student organizations exist in the department:

(1) ASME - American Society of Mechanical Engineers - open to all Mechanical Engineering students. Funding from local ASME, student government, MEAS department and fund raising events.

(2) SAE - Society of Automotive Engineers - open to all engineering students. Funding from local SAE, student government, MEAS department and fund raising events.

(3) ASM - American Society of Metals - open to Mechanical Engineering students. Funding from national ASM.

(4) Pi Tau Sigma - National Mechanical Engineering Honorary, open to Mechanical Engineering students in the top 20% (juniors) or 25% (seniors) of their class with at least a 3.00 GPA for 2 semesters' work at UCF. Funding from the national Pi

Tau Sigma Honorary Student Government, and fund raising activities.

7.4 Discipline and Records

The UCF Registrar's office keeps official academic and administrative record on the students. However, the MEAS Department maintains a file on each student which contains copies of his or her transcript, checksheet, course petitions, admission letters, T&A's and other correspondence. The file is updated each semester and, the student's graduation checksheet is finalized and typed in the semester prior to graduation.

The Student Manual describes the procedure for major discipline problems. In cases of cheating each instructor has the option to apply measures of discipline up to and including failure of the course. Most of the MEAS faculty follow the practice of failing a student for cheating and this warning is included in the course syllabi. A student so disciplined has the option, of course, of appealing the penalty through the grievance process. If the matter is not resolveable with the professor or with the department chairman, a college faculty committee is formed to hear the case. A recommendation is forwarded to the dean who rules on the matter. The student, of course, has higher level recourse if he or she wishes to pursue it.

7.5 Financial Aid and Alumni

MEAS students are free to apply for college and university scholarships and financial aids at large. In addition, both undergraduate and graduate students may be employed as research assistants on funded projects. These students may also

be eligible for a limited number of partial tuition waivers and OPS employment as laboratory assistants or paper graders within the department.

No formal mechanism presently exists for continued contact with MEAS graduates and no specific solicitation for funding from alumni has been practiced.

8.0 PHYSICAL FACILITIES

8.1 Facilities

Ground-breaking ceremonies for a new building for the College of Engineering were held December 15, 1983. It is anticipated the facility will be available for the Fall 1985 semester. The primary needs for improved departmental operation the past few years have been in the areas of student laboratory space and study rooms, graduate student facilities, and designated research laboratories. Recent appropriations have helped ease the problem of antiquated laboratory equipment, but have made the space problem worse. The new building will provide nine new laboratories for the MEAS Department with a total floor space of almost 8000 square feet. In addition, there will be six designated research areas for the College, sixteen student carrels, and four reading rooms, all of which will be partially available to the Department. A total of 84 faculty offices will become available which will ease the crowded conditions that currently exist. A significant problem that still exists within the Department, and which will not be resolved with the new building, involves the 4-inch supersonic wind tunnel that was

purchased at the time the current building was made available in 1970. The decision at that time was to place the structure in the college machine-shop area with the possibility of partitioning a separate work area. With the subsequent growth and increased activity in that room, it became generally impossible to conduct classes and/or experiments that had more than demonstration value. During the early planning phases of the new building, budget considerations eliminated a proposed aerodynamics-oriented laboratory which would have included relocating the tunnel. With the department moving to the new building and the machine shop at status quo, the utilization of this facility will probably be further reduced. This is a disappointment to those in the thermal/fluid science discipline who are interested in compressible fluid mechanics. Though research emphasis has not been high in this area, the existing facility is an excellent teaching tool and would be very useful to faculty and students in associated areas of experimental design, instrumentation, heat transfer, vibrations, and aerodynamics. The under-utilization of a supersonic wind tunnel with a replacement value in excess of $100,000 is a problem that should be addressed more positively in the near future.

8.2 Provisions

With the introduction of the planning money for the new building, the Department provided input by proposing the laboratories and utilities desired, within administered guidelines; again, the situation was unique. The assigned department members reviewed each revision to the building plans as they were presented by the architects. Other department members were consulted as particular questions arose.

Though the Department does not supply input for many of the provisions normally associated with building design, such as parking, handicapped access, etc., it does make recommendations regarding safety items and handling of hazardous materials as they arise on a case by case basis. One area of concern, however, which continues to be a problem is that of secure storage of equipment. The MEAS Department has a considerable amount of expensive, precision equipment. Although recorded and tagged by University inventory control, the Department has only minimal control on equipment location. Much of it is "stored" in faculty offices and, in many cases, equipment exists which others might use if they knew of its existence. It is difficult to judge, however, if this situation has a significantly deleterious effect.

9.0 SPECIAL ACTIVITIES

9.1 Type of Special Activities

The following are special activities in which the MEAS Department has participated:

TYPE	TITLE	WHEN	WHERE
Conference	19th National Heat Transfer Conference	July 1980	Orlando
Conference	ASME Pressure Vessel and Piping Conference	June 1982	Orlando
Conference	Florida Federation of Garden Clubs (SEEK) Conference	August 181	Orlando
National Meeting	AIChe Winter National Meeting	February 1982	Orlando
Public Relations	High School Talks on Engineering	Continuing	Orange and Seminole Co.
Task Force	Governor's Task Force on Energy Use in Industry	1981	Orlando area
Workshop	Women in Science Career Workshop	1979	UCF
Workshop	Energy Workshop for Elementary and Middle School Teachers	February 1981	UCF
Public Relations	Energy Simulator	Continuing	School and Civic Groups
Evaluation	City of Orlando Utility Commission Evaluation of Iron Bridge	1981 1982	Orlando

9.2 Organization and Funding

The organizational structure and funding for each program in section 9.1 is as follows:

PROGRAM NO.	ORGANIZATION STRUCTURE	FUNDING
1.	Local Arrangements for National Meeting - audio visual - arranged for Deke Slayton as luncheon speaker - wrote part of program	No university funding
	- student help provided	Students paid by National Organization
2.	Provided advice to local committee for the National meeting.	No university funding
3.	Provided technical program for high school students between their junior & senior years.	Funded by Garden Club
4.	-Local Arrangements Committee -Student help with registration	AIChE paid the students
5.	Individual faculty members address high school students on how to prepare for a career in engineering.	Faculty volunteers no university funding
6.	Group of 20 people including MEAS faculty members recommended techniques for reducing use of energy in selected industries - report published.	State of Florida funding
7.	Career workshop for women going into science and engineering - 4 faculty involved.	NSF funding
8.	40 teachers attended workshop on energy - 2 faculty involved.	DOE funding
9.	Simulation shows relationship between energy use, depletion of resources, and damage to the environment.	ERDA funding for simulation
10.	Evaluation determined the charge rate. 1 faculty member involved.	No university funding

9.3 Academics

PROGRAM NO.	FACULTY	ADMISSIONS	INSTRUCTION	TESTING	CREDITS
1	1 Assoc. Prof. 1 Ass't. Prof.	N.A.	None	None	None
2	1 Ass't. Prof. 1 Assoc. Prof 1 Prof.	N.A.	None	None	None
3	2 Ass't. Prof.	High School Students	Classroom	None	None
4	1 Assoc. Prof.	N.A.	None	None	None
5	2 Assoc. Prof. 2 Ass't. Prof.	High School Students	None	None	None
6	1 Ass't. Prof.	N.A.	None	None	None
7	1 Ass't. Prof.	Career Women	None	None	None
8	1 Ass't. Prof. 1 Instructor	40 Teachers	Classroom	None	None
9	2 Assoc. Prof. 2 Ass't. Prof.	High School and Civic Groups	Classroom	None	None
10	1 Ass't. Prof.	N.A.	None	None	None

10.0 GRADUATE PROGRAMS

10.1 History and Need

The Masters degree programs in Mechanical Engineering were initiated in 1972 as part of the College of Engineering's entry into several graduate areas. These programs were established in response to the need for many engineers to obtain graduate education to meet the performance demands and also established to strengthen undergraduate progams due to the synergistic effects

that accrue from having an active, dynamic research program at the graduate level.

The curricula were established with two Masters degrees: the Master of Science in Engineering (MSE) and the Master of Science (MS). The MSE degree was intended for students whose undergraduate education was in engineering and who desired graduate education that would include a broad spectrum of course work. This degree was accredited by the Engineers' Council for Professional Development (ECPD) (later renamed the Accredition Board for Engineering and Technology (ABET)). This MSE accreditation was subsequently dropped in 1982 when ABET policy changed to allow accredition only one degree level and UCF elected to submit only its BSE programs.

The MS degree was intended for students whose undergraduate education was in a scientific discipline, such as physics, and who desired to pursue graduate education in a specialized area of engineering. It was expected that any undergraduate prerequisite deficiencies would be made up before graduate courses would be taken.. The MS degree also was available to graduates of engineering programs who desired to continue their engineering education in a specialized area. The MS degree was not accredited by ABET. The MSE and MS degrees are still offered with essentially the original intent.

The Ph.D. degree in Mechanical Engineering was established in 1982, again in parallel with the College of Engineering establishment of Ph.D. programs in several areas. These programs

were intended to serve the "place-bound" engineer who needs to complete advanced level education.

10.2 Faculty

New faculty are selected based on their ability to contribute to both the undergraduate and graduate curricula of the Department and based on their ability to develop a research program that is compatible with the general goals of the department. Graduate faculty are selected from the department faculty. The only special consideration for teaching graduate courses is that the faculty member have the background and interest to teach the subject at the graduate level. To direct student research at the Master's level the faculty member must possess at least a Master's degree (preferably a Doctorate) and be willing to direct research in the subject of the student's research.

To direct student research at the Ph.D. level the faculty member must possess an earned doctorate, possess scholarly and professional credentials in his or her discipline, have prior experience in teaching graduate courses, demonstrate evidence of current scholarly research, and demonstrate a willingness to direct Ph.D. level research.

10.3 Students

The admission requirements are a GPA of 3.0 for the last two years of undergraduate work or a score of 1000 on the Graduate Record Exam. Candidates for the MSE degree must have a BSE or equivalent from an ABET accredited engineering curriculum.

Candidates for the MS degree must have a baccalaureate degree from a discipline appropriate to the specialized area of study. Candidates for the Ph.D. degree must have a MSE or MS degree from a discipline appropriate to the area of study.

To remain in good standing a student must maintain a minimum GPA of 3.0 in the program of study. A student who fails to achieve this is reverted to post-baccalaureate status and must achieve a satisfactory GPA within nine semester hours or is dropped from the program.

Students are responsible for choosing their own research advisor. Students select their research advisor by consulting with all advisors on available projects and choosing one which most matches their interests or by finding an advisor willing to direct a research project initiated by the student. The student normally selects an advisor during the first or second semester of graduate study. The advisor and student together develop the student's program of study. Candidates for the MSE degree must complete a selection of 15 semester hours of required courses as part of the program of study. At least 50 per cent of the student's program must be 6000 level courses. The remaining 50 per cent are normally 5000 and 6000 level courses. With the approval of the advisor up to two 4000 level courses may be included in the program provided they are not 4000 level courses normally required in the BSE program. Undergraduate students may not register for 6000 level courses. Senior undergraduate students who meet graduate admissions criteria (3.0 GPA) may take 5000 level courses. Graduate Assistants are employed on

sponsored research projects and utilized as graders/assistants in undergraduate courses.

10.4 Instruction

Most graduate courses offered by the Department are made available at UCF's area campuses via instructional television. The on-campus course is video-taped and students may take the course on a delayed basis by viewing the videotapes. This system is very advantageous to part-time students who are unable to come to campus during daytime to take the courses as they obtain the same course as the on-campus student. The principal disadvantages are the students inability to ask immediate questions and the delay in assignments arriving to the instructor and being returned to the students.

10.5 Library

The principal library resource which supports the graduate program is the acquisition of current technical journals, symposium volumes, conference proceedings, etc. These materials allow faculty and students to keep abreast of latest developments in areas covered in course work and research. At the present time the Library is marginally adequate in this area due primarily to very limited funds. If library funding continues to decline as it has over recent years, it appears inevitable that the Library will not be able to provide the current publications necessary to support an up-to-date, aggressive graduate program in engineering.

10.6 Financial Resources

The funding for the graduate program is provided by state

funds, student tuition and external research projects and grants. Two to four FTE faculty are supported by external research funding. This represents 10 to 25 percent of the faculty. To support a viable Ph.D. program it is desirable to increase the research funding to six to eight FTE representing 30 to 50 percent of available faculty time.

To the greatest extent possible, full-time graduate students are supported from externally funded research projects.

10.7 Graduate Enrollment

GRADUATE ENROLLMENT AND DEGREES AWARDED

	1978-79		1979-80		1980-81		1981-82		1982-83	
	MS	Ph.D.	MS	Ph.D.	MS	Ph.D.	MS	Ph.D.	MS	Ph.D.
	MSE		MSE		MSE		MSE		MSE	
Enrollment		0		0		0		0	40	6
Degrees	5	0	3	0	4	0	4	0	5	0

11.0 RESEARCH

11.1 Administration

The department chairman encourages research by channeling information and providing linkages between people. He works closely with junior faculty by pointing out opportunities in research and going over their proposals with them in detail prior to submission. A flexible approach to providing release time, space, equipment, secretarial support, and funding for travel is followed to encourage research. Research is evaluated and rewarded by ranking the faculty on research productivity.

Evaluation is based on publications in refereed journals, external references to published journal articles, contract dollars brought to the University, and on the quality and quantity of written proposals.

Current research and teaching efforts are generally well balanced in the Department and there is flexibility in assignment to stimulate research; however, the legislated mandatory 12 hour teaching rule is a deterrent both to initiating and conducting research, and as such has an adverse effect on faculty morale in the Department. There is general agreement that a rule is necessary to provide a measuring standard but there is also a belief that 12 classroom contact hours is prohibitively high in a University with a serious commitment to quality in research. In the Department, there is a direct relationship between research, tenure, promotion, and salary increases.

The Chairman's leadership role in the research is twofold. On the one hand he encourages research by members of the faculty, and on the other hand he serves as a role model in his own research and by recruiting new faculty that will complement the overall research productivity of the department.

11.2 Funding

Below is a summary of research funding in the department for the past three years:

MEAS RESEARCH FUNDING SUMMARY

(DOLLARS)

YEAR	OUTSIDE GRANTS	UCF FUNDING			TOTAL
		DIV OF SPON RES	UCF IN-HOUSE	EIES	
1982/83	103,775.00	4,970.00			108,745.00
1981/82	116,106.00		15,520.00		131,626.00
1980/81	303.830.10	556.00			304,386.10

The decrease in research activity during this period was influenced by a decrease in money available for energy research during this time period and a transition in leadership in the Department. With a more diversified set of proposals planned and a new Department Chairman emphasizing research activity, the goal is to have all faculty involved in some research activity with roughly $500,000 annually in outside grants in 5 years.

11.3 Space

The space currently devoted to research is shown below:

FACULTY RESEARCH	FACULTY AND STUDENT RESEARCH	FACULTY RESEARCH AND TEACHING
200 ft^2	300 ft^2	2700 ft^2

The first phase of the new engineering building does not include sufficient research space. However, combining the third phase of the engineering building with a planned addition near

the sewage treatment plant, current research space is expected to triple in 5 years and double again in 10 years.

11.4 Future Development

It is recognized that some researchers work better alone while others work better with colleagues, and it is a department goal to accommodate both types of individuals. Likewise, it is recognized that research and teaching are mutually supportive and the ideal is to have each member of the faculty split his time equally between teaching and research.

12.0 SUMMER TERMS

12.1 Courses

All engineering core courses are offered in the summer term. Some MEAS Department option courses are offered in the summer term. The rationale for selecting summer course offerings is as follows:

1. All departmental laboratory courses are offered primarily to relieve some of the enrollment pressure that would exist if they were offered only in fall and spring semesters.
2. About half of departmental required undergraduate lecture courses are offered in an alternating manner so that over a two year period each required course will be offered once in a summer term.
3. Normally, required graduate courses are not offered in the summer.

4. At least one, and preferably two undergraduate elective courses, are offered in the summer. These are selected based on the time elapsed since the course was last offered, the availability of appropriate faculty, and on probable enrollment as determined from a survey of undergraduate students during the spring semester. Some preference is given to courses that might be used for both undergraduate and graduate electives.

5. Two or three elective graduate courses are offered in the summer. These courses are selected with the intention that each elective graduate course will be offered once over a two year period and that not always the same course will be offered in the summer. Also as noted in 4 above, some preference is given to courses that are suitable for both graduate and undergraduate students.

12.2 Faculty

Faculty for the summer term are selected from a college-wide priority listing which is developed based on the faculty members' having secured partial support with external research funding and the cumulative amount of release time the faculty member has generated by external research funding. Those faculty who do not desire a summer teaching appointment are then removed from the priority listing. Normally, in the recent past, all faculty who desire summer appointments have received them.

12.3 Funding

The funding for summer research appointments is provided from the externally funded research grants secured by individual faculty members. Funding for teaching appointments is provided from state allocated monies.

12.4 Schedule

All courses offered in the summer are for the full 12 week term (Summer C semester) with a three credit hour course normally meeting 4 hours per week to achieve the same contact time as in a regular 15 week semester. The Department does not have any regular workshops or institutes that are routinely offered in the summer.

12.5 Students

The students in the summer terms are a subset of the students in regular terms with no detectable variation in mix. Approximately 60 per cent of regular term students attend summer terms, some with a full course load and some with a reduced course load. Students are required to accumulate 10 hours in summer terms. Because of the relatively large number of course offerings, especially in the Engineering Core, there are ample courses for the students to satisfy this requirement. Students planning to take a full load for several summer terms would be advised, to the extent consistent with meeting sequencing and prerequisite requirements, to save those courses that are very likely to be offered in summer and to take in the regular terms those courses unlikely to be offered in the summer terms.

13.0 COMPUTER REQUIREMENTS

13.1 Impact and Needs

Clearly the computer and its related technologies are increasingly important tools for the mechanical engineer for solving engineering problems. The Department must develop its curriculum to include the desireable computer content to make its graduates literate and confident in their approach to computers. The trouble comes with the rapid advance in computer technology which makes the configuration and capabilities of today's computer system surely different from those the student will encounter after graduation. The fundamentals and procedures the student learns must therefore readily adapt to each new generation of computer. Also it must be emphasized that a computer only produces a solution for a model of the physical world. The student must learn to develop the model for the physical problem and select the appropriate program. The computer solution should not be substituted for understanding what is being simulated.

With the primary emphasis on teaching sound engineering principles, then, the computer should be integrated into the curriculum in ways to enhance the understanding of the physical phenomena. Computer output should be regarded with healthy skepticism and with great emphasis on verification and checks. The first step in achieving computer competency of the engineering graduate is the integration of computer-oriented assignments in the traditional mechanical engineering courses.

Using the computer as a design tool implies a system using graphics terminals and specific engineering design software with the primary focus on interactive computing. This capability must be addressed throughout the mechanical engineering program, supporting concepts in a number of courses, as well as being a major focus in the capstone design course. It is important that the students be exposed to concepts employed in CAD packages and given exposure to at least one high level procedural language and its limitations.

The student's background includes an introductory course with emphasis on how to design a well-structured program, i.e., one which is readily understood and modified by others. This course must include an introduction to numerical analysis with topics on error estimates. Engineering examples should be used where possible and the use of "user friendly" graphics encouraged. Non-numeric topics showing how the computer can serve the engineer in a much broader way than as a number cruncher (e.g., artificial intelligence) should be included.

In the core courses (for instance, the calculus sequence) the computer must be integrated as a computational tool with discussions of numerical methods, accuracy/error considerations, etc.

14.0 THE BREVARD, DAYTONA AND SOUTH ORLANDO CENTERS

14.1 Courses

All graduate level courses which are presented on the Instructional TV system are available at the Centers. This is

true, incidentally, for all academic departments in the College of Engineering. Students at the Centers view the video tape on a regular basis and submit homework and take exams in the same sequence as the on-campus class. The tapes are generally viewed in the evening hours. Students who have questions on course work ordinarily call the instructor on the campus. The centers handle registration for classes, manage the facilities for tape viewing, monitor exams, and handle other course materials. A courier service delivers and picks up tapes and course materials to and from the centers.

14.2 Faculty

This Department does not originate any course at one of the Centers. Although office hours are not available at the Centers, students can, and do, call the instructor when a question arises.

14.3 Funding

Funding for the Instructional TV system goes directly to the College of Engineering and no costs for direct instruction are directly assigned to the department. Faculty are encouraged to make at least one visit to the students taking his/her course at each of the Centers and the cost of this travel is defrayed by the Department Expense budget.

14.4 Facilities and Library

The facilities at each Center are sufficient for courses offered in the graduate programs of the Department. Although the library facilities at the Centers are limited, this offers no impediment to learning in most of the courses. When students are ready to work on a thesis or research report, they usually come

to the campus and use UCF's central library facilities. The Centers can arrange for borrowing of books from the library on campus so that special reference works can be obtained by a student if desired.

15.0 MEDIA

The use of media for instruction in the MEAS Department is centered mainly around two areas:

1. The major area where graduate faculty members of the department participate is the Instructional TV System between the main campus in Orlando and the South Orlando, Brevard,and Daytona Beach campuses. This system utilizes a candidate camera approach. The faculty member records the subject lecture in front of a live audience (students) in the College of Engineering TV studio and the recorded video tapes are hand-carried to the other centers. The tapes are considered the property of both UCF and the faculty member (course instructor). At the present time, there is no, well-defined, set policy of proprietary rights to protect faculty, however, as a regular procedure, recorded materials are erased after the tape has been shown (normally after two weeks) and the tapes are ensured not to be copied. It is the College of Engineering policy to give the faculty member who teaches such courses additional contact hours as a compensation for his or her extra effort. It is

suggested for undergraduate courses that require multiple sections that these also be video-taped and then assigned to Graduate Teaching Assistants to monitor individual sections.. This represents a potential future extension for such a facility, and the same idea can be applied in orientation material for laboratory sections.

2. The College of Engineering has purchased the McGraw-Hill Engineering film series: Strength of Materials Laboratory and seven of these films are usually shown during the course EGN 3331 Mechanics of Materials. The COE has received permission to reproduce information concerning these films from their film guide, and such descriptive material, which is very detailed and comprehensive, is included within the course laboratory manual.