TABLE 1. FACULTY WORKLOAD
For Schools with Semester Calendar

Basis: Sixteen week semester (640 hrs.) 1 point for 6.4 hrs. of work
Full Load = about 100 points/semester

I. TEACHING AND ADVISING
1. Undergraduate Advising, 0.12 per semester per advisee (0.8 hr.)
2. Instruction
A 3 credit course meets three 50 minute periods per week for 15 weeks plus a final exam period.
UG—7.3 x c (1 + (n-25)/100)
c = credits, n = no. of students
Grad—10 x c (1 + (n-15)/100)
Lab—Multiply UG by 1.5
New Course to department—All 5.3 x c
New Course to instructor—Add 3.3 x c
Independent study or research (undergraduate or non-thesis graduate), 4 x no. of projects, one-three students/project
2-3 credits of Design involving meetings with groups of 2-5 students—4 x number of groups

II. RESEARCH AND GRADUATE STUDY
1. Graduate Research Adviser
Each of students 1 & 2—8
Each of students 3 & 4—6
Each of students 5 & 6—4
2. Research Proposals—4 to 12 (3 day to 10 day)*
3. Papers—4 to 12 (3 day to 10 day)*
4. Sponsored Research Administration, Supervision, and Technical Reports—% salary support reduced by credit under 1, 2, 3 if applicable.
5. M.S. Committees—0.6 (1 day/2 semesters) (Chm. credit is given under 1.)
6. Ph.D. Committees—0.8 (1-1/2 day/2 semesters) (Chm. credit is given under 1.)

III. SERVICE TO UNIVERSITY, PROFESSION, AND PUBLIC
1. Committees and Offices
University, College, and Department—2-5 (13-32 hrs.) according to workload plus 2-5 if chairman. Ignore minor or inactive committees.
Professional Organizations—2-5 according to work involved plus 2-5 if chairman.
2. Dept. Administration—assigned duties, variable credit*
3. Seminar Presentation—off campus 2.5 (2 day) —on campus 1.2 (1 day)
4. Meeting Paper Presentation and Preparation 4-7.5 (3-6 day)*
5. Technical Meeting Symposium Chairman—4-6 (3-5 day)*

IV. SCHOLARSHIP AND PROFESSIONAL DEVELOPMENT
1. Meeting Attendance—4 each (3 day) or as appropriate for length of meeting*
2. Paper and Proposal Reviews—0.6 to 1.3 (1/2 day - 1 day)*
3. Literature Reading—no specific credit

*Credit determined after evaluation of work involved in consultatation with the individual faculty member.

FACULTY WORK LOAD MEASUREMENT AT NJIT

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THIS STUDY WAS undertaken by the Faculty Council of New Jersey Institute of Technology in the Spring 1971 to gather data pertinent to the faculty loads at various schools. The survey was made involving 101 universities of which 66 replied.

In order to collect as much data as possible a preliminary letter with six questions was sent to 101 schools. A month and a half later, a follow up letter was sent to those schools who didn't reply. A total of 66 schools finally replied. After initial analysis of the data a third letter was sent to 46 schools of the 66 who had attempted to answer the questions initially asked.

The results of the survey are summarized in Tables 1-4. Table 1 shows that 65.3% (66 schools) contacted returned replies. Of these 69.6% (46 schools) answered the questions asked and hence 45.6% (46 schools) of the total survey (101 schools) were tabulated in Table 2. Of the schools who sent general replies and could not be tabulated (20 schools or 19.8% of total survey), most indicated load reductions are granted. About 97% of all schools surveyed indicate some load reduction. Table 2 shows the distribution of the schools based on the questions asked.

Dr. Deran Hanesian is professor of chemical engineering and chairman of the department of chemical engineering and chemistry at New Jersey Institute of Technology. He is a graduate of Cornell University where he majored in chemical engineering and did other studies in physical chemistry, organic chemistry and polymeric materials. He is a specialist in chemical reactor engineering. Before joining the NJIT faculty in 1963 he had been associated with E. I. du Pont de Nemours as a chemical engineer doing production and development work in a nylon intermediate process and later as a research leader developing new marketable materials in the fluorcarbon area. Dr. Hanesian is a member of a number of leading professional societies and has played a leadership role in both the North Jersey and national organization of the AIChE. He serves as a member of the advisory board of AIChE's journal, **International Chemical Engineering**.

ADMINISTRATOR LOAD REDUCTION

THE LARGE PERCENTAGE in the "other" category resulted from responses indicating hours of reduced load without indicating what the normal teaching load is. This clarification was sought in a follow up survey. In general, from the initial survey it appears that the majority of schools reduce the load of chairmen from 25 to 50%.

In the follow up survey, the 46 schools tabulated in Table 2 were asked for clarification on what is considered a normal load and the load reduction for department administration. Of these schools 78.3% replied to the second survey.

The results in Table 3 and 4 indicate that about 39.5% consider 9 hours a normal load but almost an equal number 45.5% consider 12 hours as a normal load.

Of these schools tabulated 34.2% reduce the chairman's load 50% while 25.8% reduce the load 33%. It therefore seems that the chairman's work load is reduced about 33-50% in most cases. Whether this amounts to a one or two course reduction depends upon what is considered a normal load for the school (9 or 12 hours).

Only a small number of schools reported the existence of associate chairmen (19.5%) and assistant chairmen (8.3%). For these positions when they exist load reduction is about 20-25%.

TABLE 1. Summary of Survey

1.	Number of Schools Surveyed	101
	Number of Replies	66
	% Replies	65.3%
2.	Number of Replies	66
	Number which answered Survey and were Tabulated	46
	% of Replies in Tabulation	69.6%
	% of Survey in Tabulation	45.6%
3.	Number of General Replies	20
	% of Replies which are general	30.4%
	% of Survey which is general	19.8%
	Number of General Replies Indicating Load Reduction	18
	Number with No Load Reduction	2
4.	% of Total Survey Indicating Load Reductions	97
	% of Total Survey giving No Reduction	3

ADVISEMENT COMMITTEES

ABOUT 96% of the schools reported no load reduction for advisement of college organizations. The majority (70%) indicate no reduction in load for new course and laboratory development. Some schools give financial support over the summer for new course development. Half of the schools indicate no reduction in teaching load for advisement of Ph.D., M.S. and senior students in projects or theses. However, many of these (ca 70%) are on a normal load which is either a 6 or a 9 hour schedule. In general it appears that a reduction of one course is the rule. Differential Weighting of Graduate versus Undergraduate Courses is similar to student advisemen. Although 65.2% indicate no reduction, many (ca 60%) of these are on a 6-9 hour teaching schedule and the weighting factor has essentially been considered in establishing the load.

Most schools (91.2%) do not reduce loads for committee work. In special cases involving much work such as Faculty Council Chairmen or College Senate Presidents, loads are reduced 25%. Occasionally when special studies are undertaken for the school, these studies require a reduction in load. In general, the feeling seems to be that committee work is a necessary part of the job and that everyone should be *equally* involved. Therefore, this aspect of work load will tend to even out as reported in some letters.

TABLE 2. Summary of Tabulated Results for Load Reduction (46 schools, 46% of Survey)

		Number of Schools	% of Tabulated Results
1.	**Load Reduction for Chairmen, Administration**		
	Reduction 100%	0	0.0
	75%	2	4.4
	67%	0	0.0
	50%	9	19.6
	33%	6	13.0
	25%	8	17.4
	0	5	10.9
	Other[1]	16	34.7
	TOTAL	46	100.0
2.	**Advisement of College Organizations**		
	Reduction 25%	2	4.4
	0%	44	95.6
	TOTAL	46	100.0
3.	**Development of New Courses and Laboratories**		
	Reduction 33%	1	2.2
	25%	3	6.5
	0%	32	69.5
	Other[2]	10	21.8
	TOTAL	46	100.0
4.	**Advisement of PhD, M.S. and Senior Students in Thesis or Project**		
	Reduction 50%	2	4.4
	33%	1	2.2
	25%	5	10.9
	0%	23	50.0
	Other[3]	15	32.5
	TOTAL	46	100.0
5.	**Differential Weighting of Graduate Versus Undergraduate Courses**		
	50%	1	2.2
	33%	2	4.4
	25%	7	15.1
	0	30	65.2
	Other[4]	6	13.0
	TOTAL	46	100.0
6.	**College Committees**		
	25%	3	6.6
	0%	42	91.2
	Other[5]	1	2.2
	TOTAL	46	100.0

FOOTNOTES:

1. 25% if less than 10 faculty; 35% if greater than 10; Individual Judgment; 0-1 course; 1 dept head/25 faculty; Set by Chairman; 6-9 hours load; 1, 2, or 3 course load; Proportionate reduction; 1/3 - 2/3! Dept. Administration gets total 1/2 time; 40% for chairman, 25% Asst.; Chairmen for large depts.; If less than 21 faculty, 1/3 reduction; If 21 - 41, 2/3 reduction; If greater than 60, 100%; If more than 9 faculty, 50% reduction, less than 9, 25% reduction; 3-9 hour loads.
2. Varies; Only occasional reduction.
3. 1/8 hour credit non thesis M.S.; 1 credit for thesis M.S., 2 credits for PhD; 2-4 students equals a 3 hr. course; No Grduate Work; 1 hr. for PhD; M.S. gets 1 hr. credit, PhD gets 2 hrs credit; Reduction based on credit hours/35; 1/2 credit hr per student; 4 M.S. students is equal to 1 hr.
4. No graduate work; Upper division—2 x lower division, Graduate division—4 x lower division.
5. Only temporary reduction in load for committee work.

FORMULA BUDGETING

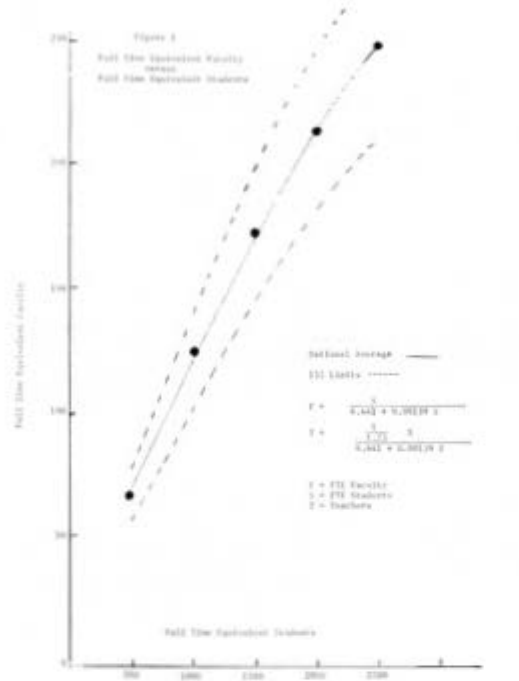
USING DATA available in the 1973 Annual Directory of the ASEE, Engineering College Research and Graduate Study, and enrollment figures for Fall 1972 from the Engineering Joint Council, student-faculty and student-teacher ratios were calculated and are shown in Figure I. The study was made by a joint committee represented by deans, department chairmen and Faculty Council chairmen from Rutgers College of Engineering and NJIT and a representative of the Department of Higher Education, State of New Jersey.

The relationship shown in Figure 1 is not completely linear since larger schools can cover essential programs with larger student-faculty ratio but smaller schools need a smaller student-faculty ratio to cover the same essential program areas.

It was proposed that to stabilize faculties, no terminations or additions be made unless the 15% limits of the correlations were exceeded. At that time the principle pressure was to terminate faculty because of a drop in engineering enrollments. Today with enrollments in engineering increasing, the pressures are in the direction of operation with higher student-faculty ratios because of fiscal problems everywhere in the United States.

COMMENTS AND CONCLUSIONS

ONLY GENERAL CONCLUSIONS resulted from this particular investigation, and currently in New Jersey, other methods of financing post secondary education are under study. It is my



personal opinion that the ASEE must determine some proper faculty load system, get more active in enforcing these standards for engineering education, and obtain general acceptance of engineering as a professional education. The American Medical Association has gained this professional acceptance for its medical schools and as engineering professionals we should not compromise for less. Some general conclusions follow.

TABLE 3. Normal Teaching Load

1. Schools Surveyed		46
2. No Replies		36
3. % Replies		78.3
4. Normal Teaching Load		
		% of Replies
15 hours		3.0
12 hours		45.5
9 hours		39.5
6 hours		9.0
3 hours		0.0
Other		3.0
	TOTAL	100.0

TABLE 4. Administrator Load Reduction

	CHAIRMAN	ASSOC. CHAIRMAN	ASST. CHAIRMAN
1. Number Reported	35	7	3
2. % of Schools Replying	97	19.5	8.3
3. Load Reduction		Percent of Reported	
100%			
75	5.7		
67	5.7		
50	34.2		
33	25.8	14.3	33.3
25	8.6	71.4	
0	5.7		
Other	14.3	14.3	67.3
Total	100.0	100.0	100.0

- **Normal teaching loads seem to range from 9 to 12 hours. For heavy graduate programs this load drops to 6 hours and in one case to 3. Seldom are loads encountered above 12 hours. A 12 hour teaching load is high for those involved in graduate programs and research.**
- **Load reductions for departmental supervision involving chairmen, associate chairmen and assistant chairmen indicate that the reduction of loads by 75% or 100%, by permission, for chairmen of large departments is seldom encountered. Load reduction seems to be about 50%. The factor of auxiliary departmental support was not included in this study and is important.**

TABLE 5. Ratios Recommended for Quality Engineering Education. (Mid America State Universities Association Peters, Eng. Ed. 61, No. 7, 840-843, 1971)

TEACHING LEVEL	FTE STUDENT/ FTE FACULTY*
Lower Division	12 to 1
Upper Division	9 to 1
Master's Program—Course Work Only	8 to 1
Master's Program—Thesis Required	6 to 1
Doctorate Program	4 to 1

*A Full Time Equivalent Undergraduate Student is one taking 15 credit hours per semester.
*A Full Time Equivalent Graduate Student is one taking 12 credit hours per semester.
A Full Time Equivalent Faculty is not defined but is presumably one who teaches 12 semester credit hours.

- No reduction in load is granted for advisement of college organizations.
- Most schools do not grant release time for new course and laboratory development.
- About one half the schools do not give release time for advisement of senior projects, M.S. and Doctoral Students. About 70% of these, however, are on a 6-9 hour teaching load rather than a 12 hour base load.
- Differential weighting of graduate versus under graduate courses is not the rule in most schools. It can be included in an adequate overall reduction in load for the graduate program. In schools with graduate programs, the base load is 6-9 hours rather than 12 hours and a reduction has already been considered.
- No reduction in load is granted for college committee work since most replies seem to feel that committee assignments even out.
- An average correlation of FTE Faculty (F) and FTE Students (S) is

$$F = \frac{S}{6.641 + 0.00139\ S}$$

TABLE 6. Auxiliary Departmental Personnel. (Mid America State Universities Association Peters, Eng. Ed. 61, No. 7, 840-843, 1971)

TYPE OF PERSONNEL	FTE FACULTY REQUIRED PER FTE OF EACH TYPE OF PERSONNEL
Teaching Assistants	2
Secretarial Assistance	
Lower Division	10
Upper Division	6
Master's Program	3
Doctoral Program	2
Recommended	4
Technician Assistance	
Lower Division	10
Upper Division	6
Master's Program	3
Doctoral Program	2
Recommended	4

ChE books received

GLOSSARY OF CHEMICAL TERMS

C. A. Hampel and G. G. Hawley
Van Nostrand Reinhold, 1976, 281 pp., $14.95.

This glossary is a reference for students of chemistry and chemical engineering and professionals in other sciences who need basic definitions of chemical technology. It contains 2,000 entries including terms used in the several subdivisions of chemistry and chemical engineering and those in common usage in the chemical industries.

BOOK REVIEW

PETROLEUM AND THE CONTINENTAL SHELF OF NORTH WEST EUROPE—Volume 2 Environmental Protection

Edited by H. A. Cole,
Halsted Press, 1975. 126 pages.

Reviewed by James D. Wall, HYDROCARBON PROCESSING, Houston, Texas

This work is a compilation of articles and floor discussion from a meeting involving geologists associated with the North Sea. Thirteen articles discuss definition of the pollution problem in producing oil offshore, the general effects of oil pollution on elements of the environment and isolated requirements for control involving political and monitoring considerations.

The work is disappointing for those familiar with the oil industry and the environment. It suffers from lack of depth in review for those familiar with the subjects. Particularly does it suffer from lack of significant association to the problems in the North Sea. Most of the work could have been written for any offshore operation or any oils-water situation.

For those unfamiliar with oil production or environmental protection, the work does give a review of part of the data such that an opinion could be developed relative to the significance of the problems encountered. □

DUKLER: Role of Waves

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