

24TH ANNUAL AMS SURVEY, 1980

Second Report

**Employment of Mathematical Sciences Doctorates,
Faculty Mobility, Nonacademic Employment, Fall 1980**

by **Donald C. Rung**

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Second Report

A first report of the 1980 Survey appeared in the November 1980 *Notices*, pages 602–629. It included a report of the survey of faculty salaries, a first report of the survey of new 1979-1980 doctorates, and a nonacademic salary survey. This second report includes an update of the fall 1980 employment status of new doctorates, an analysis of faculty mobility, and a report on fall 1980 enrollments and class sizes.

The 24th Annual AMS Survey was made under the direction of the Society's Committee on Employment and Educational Policy (CEEP), whose members in 1980 were Lida K. Barrett (chairman), Arthur P.

Mattuck, Donald C. Rung, Hans Schneider, Robert J. Thompson and William P. Ziemer. A Data Subcommittee of CEEP, consisting of Lida K. Barrett, Lincoln K. Durst, Wendell H. Fleming, Arthur P. Mattuck and Donald C. Rung (chairman), designed the questionnaires with which the data were collected. The committee is grateful to members of the AMS staff, especially Marcia C. Almeida and Peggy Reynolds, for the diligence and efficiency with which the data were collected and compiled. Comments or suggestions regarding this program may be directed to the subcommittee.

Employment of Mathematical Sciences Doctorates, Faculty Mobility, Nonacademic Employment, Fall 1980

by Donald C. Rung

This is one of a series of annual reports on trends in the job market for Ph.D.'s in the mathematical sciences. The report begins with an update of the fall 1980 employment status of new 1979-1980 doctorates. This is followed by a discussion of trends in the academic job market in four-year colleges and universities, based on 1980 AMS Survey data on faculty mobility. The article discusses recent trends in nonacademic employment and concludes with enrollment and class size information.

There was virtually full employment of Ph.D. recipients from 1979-1980 (Table 1). In fact, there were virtually no unemployed ex-faculty members who left academic life (Table 2). The number of doctorate-holding faculty members at four-year colleges and universities increased by about 400,

the largest increase in recent years, and compared to an increase of 275 in 1979 (Table 2). Most of the increase was in Group I (37), Group V (91), Group M (129) and Group B (129) departments; all other departments showed little change. (See box for descriptions of the Groups.) Enrollments in mathematics and related courses continued on-ward and upward, and, not unexpectedly, so did class sizes in most categories (Tables 7 and 8). The increase in the number of full-time faculty members (up 3%) did not keep pace with the enrollment increase of 8%, and predictably the number of part-time faculty members increased (by 10%). A pleasing increase was the 17% jump over last year in the number of junior and senior mathematics majors and an 8% increase in the number

In this article departments in mathematical sciences in U.S. and Canadian universities and four-year colleges are classified as below. The first six groups consist of departments that have doctoral programs, of which Groups I-V are U.S. departments. (The numbers indicate how many departments were queried in the 1979 Survey.)

- Group I: the top 27 ACE ranked mathematics departments.
- Group II: the other 38 ACE rated mathematics departments.
- Group III: 87 mathematics departments not included in the ACE study.
- Group IV: 66 statistics, biostatistics and biometry departments.
- Group V: 127 other mathematical science departments (includes 74 in computer science).
- Group VI: 36 Canadian departments in the mathematical sciences.
- Group M: 345 departments with masters' programs (of which 18 are Canadian departments).
- Group B: 1,062 departments which offer at most bachelors' degrees (of which 32 are Canadian departments).

Notes: Group B includes about 100 departments with no degree programs. Both M and B include some departments in universities which have doctoral programs in other areas, in some cases in other areas of the mathematical sciences.

Response rates varied from one group to another, with the largest response rate from Groups I, II, and III. Of an estimated total of about 18,650 full-time U.S. mathematical sciences faculty members, over 9,800 are members of departments which responded to the survey.

For an account of the ACE ratings referred to above see *A Rating of Graduate Programs* by Kenneth D. Roose and Charles J. Andersen, American Council on Education, Washington, D.C., 1970, 115 pp. The information on mathematics was reprinted by the Society and may be found on pages 338-340 of the February 1971 issue of the *Notices*.

of first-year graduate students, with the same percentages applying equally to Groups I—III. The number of new doctorates taking nonacademic employment held steady at 202 (29%), the same figure as last year (Table 4), as did the estimated outflow of doctorate-holding faculty members to nonacademic employment (Table 6). It is interesting to note that at the San Antonio Employment Register (January 1980) the ratio of positions available to applicants fell below one (0.73) for the first time in recent memory. If this is coupled with the sudden increase of 161 in the number of nondoctorate full-time faculty members (as opposed to the decrease of 25 reported last year), one can speculate that there is, in fact, a moderate shortage of Ph.D.'s for the academic marketplace. This increase in the nondoctorate faculty was the first increase reported in this series since it was begun in 1971. During the period 1971 to 1979 the nondoctorate faculty decreased steadily from 6150 to 3775, while the doctorate faculty increased from 10,950 to 14,325.

FALL 1980 EMPLOYMENT STATUS OF 1979-1980 NEW DOCTORATES

Table 1 contains the fall 1980 employment status by type of employer and field of degree for 858 new mathematical sciences doctorates who

received the degree between July 1, 1979, and June 30, 1980. The names of these 858 people, and the titles of their doctoral theses, were published in the November 1980 *Notices*, pages 616—629. Table 1 updates the corresponding table on page 608 of the November 1980 *Notices*, using more recent information provided by departments and the recipients of the degrees. The total does not include a few more recipients of doctorates who were reported too late to gather employment information for these reports. (A supplementary list of recipients will appear in the April 1981 *Notices*.)

The first five rows in Table 1 refer to those 1979-1980 new doctorates employed by doctorate-granting departments in the U.S. The next two rows refer to those employed by U.S. mathematical sciences departments which grant masters and bachelors degrees only.

The proportion of new doctorates employed in colleges which do not have Ph.D. programs has been steadily declining (see the October 1978 *Notices*, page 399). Table 1 shows only 153 new 1979-1980 mathematical sciences doctorates employed in colleges. But nearly half (75) were faculty members who were already employed in the same department before completing the Ph.D.

Table 1 shows only 7 of 858 new 1979-1980 doctorates still unable to find employment by fall 1980, indicating a good job market for new math-

TABLE 1—1980-1981 EMPLOYMENT STATUS of NEW DOCTORATES in the MATHEMATICAL SCIENCES

Type of Employer	PURE MATHEMATICS					Statistics	Computer Science	Operations Research	Applied Mathematics	Mathematics Education	Other	Total
	Algebra and Number Theory	Analysis and Functional Analysis	Geometry and Topology	Logic	Probability							
Group I	12	24	15	2	1	3	0	1	3	0	5	66
Group II	16	5	15	2	5	3	0	0	5	1	3	54
Group III	8	14	8	6	3	12	1	0	10	0	1	64
Group IV	0	0	1	0	2	17	0	1	0	0	0	21
Group V	0	0	0	0	1	2	20	6	2	0	3	34
Masters	12	8	8	3	1	14	7	1	5	2	7	68
Bachelors	23	17	12	0	1	3	4	2	8	6	10	86
Two-year College or High School	8	2	0	0	0	0	0	0	1	1	2	14
Other Academic Departments	1	3	1	1	3	23	6	9	2	1	4	54
Research Institutes	6	2	5	0	2	4	1	2	3	0	3	28
Government	2	2	3	0	2	12	3	3	8	0	2	37
Business and Industry	9	16	10	6	5	33	28	25	21	0	14	167
Canada, Academic	3	2	1	0	1	0	11	2	2	0	4	26
Canada, Nonacademic	2	1	2	2	1	0	1	3	4	0	2	18
Foreign, Academic	7	11	3	3	2	7	3	9	10	1	4	60
Foreign, Nonacademic	3	7	1	0	0	10	4	3	1	0	4	33
Not seeking employ.	2	1	2	0	0	2	1	1	2	0	0	11
Not yet employed	0	0	2	1	0	0	0	1	2	1	0	7
Unknown	1	3	2	1	0	0	0	1	1	0	1	10
Total	115	118	91	27	30	145	90	70	90	13	69	858

ematical sciences doctorates last year. Judging by the rather large number of advertisements in *Employment Information in the Mathematical Sciences*, January 1981 issue, the academic job market at the assistant professor level will probably continue to be strong again this year. In particular demand, by both academic departments and industry, are new (or recent) Ph.D.'s with competence in applied areas.

FACULTY MOBILITY

This part of the AMS Survey is concerned with the number of faculty members newly hired from various sources, as well as with individuals leaving faculty positions and their subsequent employment status. The Survey also monitors trends in the proportions of tenured *vs.* non-tenured faculty, and of doctorate-holding *vs.* non-doctorate faculty. The numbers of departments in the various Groups I, II, . . . , B responding to the 1980 Survey of faculty mobility are similar to those of previous years. The data obtained from those departments responding represent about half of all mathematical sciences faculty members. About two-thirds of the faculty members in doctorate-granting mathematics departments (Groups I–III) are included among responding departments.

Table 2 shows estimated faculty flow between 1979-1980 and 1980-1981 for U.S. departments. Further analyses for Groups I–III are given in

Table 3. The left-hand side of Table 2 shows the estimated numbers of new full-time faculty members hired from various sources between fall 1979 and fall 1980. The right-hand side of Table 2 shows the fall 1980 employment status of those full-time faculty members (as of fall 1979) who permanently left their departments by fall 1980. The row *graduate school* on the left-hand side includes new faculty members coming from departments outside the mathematical sciences, or from mathematics education. Similarly, the second row in Table 2 includes some moving to or from departments in other fields or other positions in academia (e.g., in a university computer or statistical laboratory). The number (+88) in parentheses represents a flow from nondoctorate to doctorate status of individuals who remained as full-time faculty members in the same department.

The numbers in Tables 2 and 3 were obtained by extrapolating from AMS Survey data, and are not actual counts. The various totals of the responses from each group were adjusted according to the ratio of the total faculty reported to the total faculty within each group, as given in a previous article in this series (February 1979 *Notices*, page 108). Nevertheless, Table 2 is believed to give a fairly reliable overall picture of current faculty mobility.

Table 2 shows an estimated increase, between fall 1979 and fall 1980, of 394 in the doctorate-holding faculty and an increase of 161 in the non-

TABLE 2 – FACULTY FLOW 1979-1980 TO 1980-1981
Full-Time Mathematical Sciences Faculty in Four-Year Colleges and Universities in the U.S.

FROM	Sources of New Faculty		TO	Fall 1980 Employment Status, Faculty Leaving	
	Doctorate-Holding	Non-doctorate		Doctorate-Holding	Non-doctorate
Graduate school	447	297	Two-year college or high school	2	42
Another college or university position	601	84	Another college or university position	486	123
Nonacademic employment	88	62	Nonacademic employment	256	93
Outside U.S.	120	6	Deaths and retirements	138	53
			Position outside U.S.	45	(<5)
			Graduate or professional school	25	62
Other sources ⁽¹⁾	99	171	Seeking employment	15	12
Total	1355	620	Other ⁽³⁾	82	74
			Total	1049	459
Received doctorate and not moving ⁽²⁾	(+ 88)		Received doctorate and not moving		(+ 88)
	1443				547

Estimated size of full-time U. S. mathematical sciences faculty, Fall 1980

Doctorate-holding 14,719 (+394 from Fall 1979)
Nondoctorate 3,936 (+161 from Fall 1979)

- (1) Part-time to full-time in same department, from postdoctoral or two-year college position, etc.
(2) Mostly in Group M and B departments.
(3) No longer full-time in department, unknown employment status, etc.

doctorate faculty, for an overall increase of 555. The data clearly indicate a nontrivial (and long overdue) increase in the total number of mathematics faculty members. However, the increase did not keep pace with rising elementary course enrollments. These numbers represent about a 3% increase nationally in the number of mathematical sciences faculty members between fall 1979 and fall 1980. The total number of teaching assistants reported for fall 1980 increased by 3% from fall 1979. On the other hand, course enrollments rose again in 1980 by 8% or more in all categories of mathematical sciences departments. Thus, it is no surprise to report a 10% increase in the part-time faculty and a further increase in class size. However, as pointed out at the outset of this article, the increase in the number of nondoctorate and part-time faculty members may be due in part to the inability of many departments to hire doctorates.

The pattern of faculty mobility shown by comparing the two sides of Table 2 is somewhat more optimistic than that observed for the previous three years. More full-time faculty members are being hired before receiving the doctorate. The figure of 620 shown in Table 2 compares with a corresponding estimate of 435 three years ago (February 1978 *Notices*, page 101). Most (78%) of the new nondoctorate faculty members were hired by departments in Groups M and B.

Attrition due to deaths and retirements continues at the yearly rate of about 1% of the total faculty. In addition, some leave tenured faculty positions to take nonacademic positions or for other reasons. The total number of faculty members who received tenure in their institutions is about 443, up somewhat from last year.

Doctorate-granting Mathematics Departments (Groups I, II, III). Table 3 gives a somewhat different perspective of faculty mobility in and out of the 152 U.S. mathematics departments with doctoral programs. In Table 3 the sources of new tenured and nontenured doctorate-holding faculty members are shown, as well as the employment status of those leaving between academic years 1979-1980 and 1980-1981.

As the left-hand side of Table 3 shows, most of those newly hired for fall 1980 are not tenured. Nevertheless, departments appear to have had some increase in tenured openings. The estimate of 35 new tenured faculty members hired by Groups I-III departments compares, for instance, with only 25 three years earlier. There was an overall increase of 56 tenured positions in Groups I, II, III, well below the increase of 90 last year.

Groups M and B. Nearly 60% of all full-time members of the U.S. mathematical sciences faculty are in departments without Ph.D. programs (Groups M and B). Of the total of about

TABLE 3 — FACULTY FLOW 1979-1980 TO 1980-1981

Full-time Doctorate-holding Faculty in 152 Doctorate-Granting Mathematics Departments in the U. S.
(Groups I, II, III)

FROM	Sources of New Faculty		TO	Fall 1980 Employment Status, Faculty Leaving	
	Non-tenured	Tenured		Non-tenured	Tenured
Graduate school	162		Doctorate Granting departments	116	22
Another college or university position	155	24	Other college or university position	60	3
Nonacademic employment	11		Nonacademic employment	61	8
Outside U. S.	31	{11}	Deaths and retirements	2	46
Other sources	19		Position outside U.S.	21	
			Seeking employment	1	{8}
			Other	23	
Total	378	35	Total	284	87
Received doctorate and not moving	(+8)		Received tenure and not moving	(+108)	
Received tenure and not moving		(+108)		392	87
	386	143			

Estimated size of full-time faculty, Fall 1980, Groups I-III

Doctorate, Nontenured	1244 (-6 from Fall 1979)
Doctorate, Tenured	3856 (+56 from Fall 1979)
Nondoctorate faculty	392 (+42 from Fall 1979)
Total full-time faculty	5492 (+92 from Fall 1979)

2063 full-time members newly hired for fall 1980, about 1187 were in Groups M and B departments and the other 876 in Groups I–V departments. Of the 1187 newly hired in Groups M and B, about 720 had doctoral degrees. (This includes, of course, many moving from other positions as well as new doctorates coming directly from graduate school.) The number of nondoctorate faculty members hired by Groups M and B departments has been steadily increasing, from about 350 newly hired for fall 1977 to 400 for fall 1978, to 450 for fall 1979, and 484 for fall 1980.

The M and B departments are very diverse, ranging from medium-to-large departments in public institutions to quite small departments in private colleges of varying degrees of selectivity. Besides mathematics instruction, mathematics departments in Groups M and B often have responsibilities in applied areas which in larger universities are taken by separate departments of statistics, operations research, or computer science. (Notice the dramatic increase in enrollments in computer science courses in these departments as given in Table 7.) Currently these mathematics departments face keen competition in recruiting in such applied fields, from industry which pays higher salaries and from university departments offering a more research-oriented environment. There are opportunities for young mathematicians with a strong commitment to teaching, who can fit the needs of Groups M or B departments.

There are in Groups M and B departments over 4000 part-time faculty members, as compared to about 11,000 full-time members. The number with part-time appointments in these groups has been increasing rather rapidly, with the increase of part-time faculty members far exceeding the increase in full-time faculty members. Although part-time mathematics faculty members still represent only a fraction of the total, this trend surely bears watching.

Graduate Student Enrollments. Doctorate-granting mathematics departments in the U.S. (Groups I–III) reported again a 1% decrease in the number of full-time graduate students from fall 1979 to fall 1980, the same decline as last year. However, the number of entering full-time first-year graduate students in Groups II–III increased by nearly 8%, the first such increase in several years. In Group I, there was the same number of first-year graduate students this year as last.

Other groups of departments reported increases in full-time graduate student enrollments, up 3% in Group IV, 8% in Group V, 1% in Group VI and 12% in Group M.

Nonacademic Employment of Doctorates in the Mathematical Sciences. Traditionally, most mathematics Ph.D.'s have held faculty positions in colleges and universities, with only about 20% of mathematics Ph.D.'s employed by business, in-

dustry, or government. However, the pattern has changed substantially for recent Ph.D.'s. Table 4 is a summary of AMS Survey data on the employment of new doctorates during the last five years 1975-1976 to 1979-1980.

TABLE 4

NEW MATHEMATICAL SCIENCES DOCTORATES
TAKING NONACADEMIC POSITIONS IN U.S.

	1975- 1976	1976- 1977	1977- 1978	1978- 1979	1979- 1980
In Government	74	62	44	34	37
In Business/Industry	112	136	166	168	165
Total	186	198	210	202	202
Total new doctorates employed in U.S.	787	776	734	690	691
% in Govt./Bus./Ind.	24%	26%	29%	29%	29%

Table 4 shows a levelling off in hiring of new doctorates by business and industry. Many of these jobs are in companies in high technology, computer-information processing, or communications areas. A significant number are with organizations which do consulting work in operations research, statistics or applied physics, or which provide computer software or data management services; other jobs are energy or automotive related, or health-care related. Not included in Table 4 are a few new doctorates, a half dozen or so per year, employed in research institutes (for example, the Sloan-Kettering Institute). The November 1980 issue of *Employment Information in the Mathematical Sciences* contains lists of the names and addresses of nonacademic employers of the individuals included in Table 4, with an indication of the thesis field of the employee.

TABLE 5

THESIS SUBJECTS OF THE NEW DOCTORATES

	1975- 1976	1976- 1977	1977- 1978	1978- 1979	1979- 1980
Pure	46	38	41	53	59
Other	140	160	169	149	143
	186	198	210	202	202

Table 5 shows that relatively few individuals included in Table 4 received a Ph.D. in pure mathematics. (The somewhat arbitrary classification "Pure" mathematics is the same as in Table 1. "Other" mathematical sciences refers to the right-hand columns: *Statistics, . . . , Other* in Table 1.) There is some inherent ambiguity in the count of "Other mathematical sciences" doctorates, since the boundary between the applied mathematical sciences and engineering is not sharp. In addition, responses to the AMS Survey of new doctorates from departments in Group V (especially from those in computer science) are less complete than from Groups I–IV. Nevertheless, the AMS data have generally fitted rather well with NRC

data obtained from the doctorate recipients themselves (Cf. February 1978 *Notices*, page 108).

In addition to new Ph.D.'s shown in Table 5 whose job after receiving the doctorate was non-academic, a significant number of others moved to positions in government, business or industry after a few years in faculty positions. Table 6 shows the estimated annual net outflow of doctorate-holding faculty members to nonacademic positions since 1976. For instance, the number 168 for 1980 is the difference of 256 doctorates shown in Table 2 leaving academia and 88 hired in academia from nonacademic positions.

TABLE 6

ESTIMATED NET OUTFLOW OF DOCTORATE-HOLDING FACULTY MEMBERS TO NONACADEMIC EMPLOYMENT

	1976	1977	1978	1979	1980
Net Outflow	155	190	190	165	168

The November 1980 issue of *Employment Information in the Mathematical Sciences* shows nonacademic employment of new doctorates for the period 1975 to 1980, by employer and field of degree. As might be expected 46% took positions in the Virginia to Massachusetts arc and 18% in California. In addition to the annual salary survey of new doctorates (November 1980 *Notices*, page 607), the AMS surveyed individual Ph.D. mathematicians in nonacademic jobs during 1980. This survey gave information about salaries and other demographic data not available from other sources. The results were summarized in the November 1980 *Notices*, pages 610 – 614.

Present indications are that the nonacademic job market for Ph.D.'s qualified and willing to work in the applied mathematical sciences will

remain strong. A positive underlying factor is the rapid growth of high-level mathematics-related opportunities generated in one way or another by the revolution in computer technology.

In summary, the mobility figures show an increase of 394 in the number of doctorate-holding faculty members in U.S. colleges and universities, a number (surprisingly) equal to the number of new doctorates taking positions in the academic sector. About 200 Ph.D.'s left academic positions for nonacademic positions in addition to the 202 new doctorates who took nonacademic positions in the U.S. About 50 of the new Ph.D.'s took positions in other (nonmathematical sciences) departments (about half were statisticians); 135 took positions outside the U.S. and the remaining 75 were scattered in various categories. The number of nondoctorate faculty members in U.S. colleges and universities increased by a surprising 161 as compared to last year's decrease of 25. There were virtually no unemployed Ph.D.'s in mathematics, either at the beginning or advanced level.

CHANGES IN ENROLLMENTS AND CLASS SIZES

As has been the case in recent years, enrollments increased from fall 1979 to fall 1980 in courses in nearly every category and for all groups of departments. The figures reveal even larger increases than those of last year in computer science enrollments which continue to expand. Overall graduate enrollment increased by 3.5%, in spite of the decline in graduate enrollment in Groups I and III.

The number of junior and senior undergraduate majors reported has increased from fall 1979 to fall 1980 in all groups except Group III, where the number of junior and senior mathematics majors decreased by 4%. Table 7 summarizes the changes in enrollments for fall 1979 to fall 1980.

TABLE 7 – PERCENT CHANGE IN COURSE ENROLLMENTS
By Type of Course, Fall 1979 to Fall 1980

Type of Course	Groups								All Groups
	I	II	III	IV	V	VI	M	B	
Below calculus	4%	2%	7%	*	*	*	5%	8%	6%
First year calculus	5%	1%	7%	*	*	8%	11%	5%	6%
Statistics	*	*	*	4%	9%	-2%	10%	6%	6%
Computer Science	*	*	*	*	18%	17%	25%	28%	24%
Other undergraduate mathematics courses	0%	11%	8%	*	*	1%	9%	4%	7%
Graduate courses	-5%	11%	7%	9%	11%	1%	10%	12%	8%
All courses	3%	4%	7%	5%	17%	6%	9%	10%	8%

*Enrollments in this type of course amount to less than 5% of total undergraduate enrollments for this group of departments.

The remainder of this report compares class sizes for mathematical sciences departments for fall 1979 and fall 1980. Class sizes continue to increase in most courses in mathematical sciences departments. (An analysis of the class sizes and related parameters for fall semesters 1976 and 1977 was presented by Lida K. Barrett in the February 1978 *Notices*, pages 104–105).

The Group I departments were alone among all doctorate-granting departments reporting that, at the undergraduate level, enrollments increased (by 4%) but that the number of sections offered decreased (by 5%) with the inevitable increase of average class size from 30 to 33. This figure is still well below Group II's average of 41 or Group III's average of 39.

TABLE 8 – AVERAGE CLASS SIZE IN FALL 1979 AND FALL 1980
(1979 figures in *italic*)

Type of Course	Groups							
	I	II	III	IV	V	VI	M	B
Below calculus	<i>31</i>	<i>47</i>	<i>43</i>	–	–	–	<i>37</i>	<i>32</i>
	34	46	43	–	–	–	39	32
First year calculus	<i>31</i>	<i>42</i>	<i>40</i>	–	–	<i>70</i>	<i>34</i>	<i>29</i>
	36	42	42	–	–	71	36	30
Statistics	–	–	–	<i>38</i>	<i>55</i>	<i>45</i>	<i>31</i>	<i>29</i>
	–	–	–	40	60	45	33	29
Computer Science	–	–	–	–	<i>50</i>	<i>72</i>	<i>31</i>	<i>28</i>
	–	–	–	–	56	83	33	29
Other undergraduate mathematics courses	<i>28</i>	<i>34</i>	<i>30</i>	–	–	<i>41</i>	<i>22</i>	<i>16</i>
	28	33	32	–	–	42	23	16
Graduate courses	<i>10</i>	<i>8</i>	<i>8</i>	<i>17</i>	<i>16</i>	<i>6</i>	<i>9</i>	<i>15</i>
	10	9	9	17	16	6	10	16
All courses	<i>28</i>	<i>38</i>	<i>35</i>	<i>29</i>	<i>36</i>	<i>45</i>	<i>31</i>	<i>27</i>
	30	38	36	30	40	47	32	28

A dash indicates that these courses represent less than 5% of total undergraduate enrollment for departments in this category.