

EDUCATION IN WOOD SCIENCE AND TECHNOLOGY: UPDATE 1978-79¹

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ABSTRACT

Current academic programs in Wood Science and Technology (WST) for the 1978-79 academic year are discussed in terms of program growth, program resources, and enrollment. Employment, demand for graduates, and salary data are given.

Keywords: Education, Wood Science and Technology, academic programs, employment, salaries.

INTRODUCTION

With the publication of the 1977-78 report (Barnes 1978), SWST provided its first professional status report since that given by Ellis (1964). Background data and philosophical concerns were presented in last year's report and will not be reported here. This year's report covers the academic year from July 1978 to June 1979. The data herein are for U.S. schools only as Canadian enrollment, employment, and salary were not available. The author expresses his gratitude to those responding and solicits any constructive comments from the readers concerning additional information to be included in future reports. A sample questionnaire is shown in Fig. 1 for reference.

ACADEMIC PROGRAMS

Program growth and changes

The past academic year saw no change in undergraduate programs, yielding a total of twenty-five undergraduate curricula. Of these, eight programs exist as options in a traditional forestry curriculum. Seven programs are administered by separate WST departments, while the balance exist as separate curricula in forestry or other departments. The M.S. and Ph.D. programs both increased by one with the addition of a Master's program at Michigan Tech University and a Ph.D. program at Mississippi State. The figures in Table 1 also include M.S. and Ph.D. programs at Texas A&M University, which were erroneously omitted from last year's report.

Two schools are currently studying the advisability of initiating programs. The University of Tennessee is considering initiation of a forest products option in their forestry program. Clemson University is evaluating the potential for a Ph.D. program to complement their existing B.S. and M.S. programs. A complete listing of degree programs may be found in the Appendix.

Other than evolutionary changes, no status changes from last year's report

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Society of Wood Science and Technology
ANNUAL EDUCATIONAL QUESTIONNAIRE



Name _____ Title _____ Ph. _____
Department _____ Institution _____
Address _____ Zip _____

I. ACADEMIC PROGRAMS

1. Degrees offered and year started: B.S. _____ M.S. _____ Ph.D. _____ 2. Please indicate enrollment by class for the academic years listed below:

Table with 3 columns for years 19____-____, 19____-____, 19____-____ (Projected) and rows for Freshman, Sophomore, Junior, Senior, M.S., Ph.D.

3. For the current academic year please indicate the number of students in each field of study:

Table with 3 columns: Undergraduate, Graduate and rows for Wood Science/Engineering, Wood Utilization/Processing, Wood Chemistry, Business (Prod. Mgt., Mkt., Sales, Etc.), Building Construction, Pulp and Paper, Undecided, Other

- 4. Please indicate the following for your WST faculty and resources:
a. No. of total WST faculty by rank: Ass't. Prof. _____ Assoc. Prof. _____ Prof. _____
b. No. of full-time equivalents-teaching: _____
c. Facilities adequate for teaching program: Yes No
d. Funding adequate for teaching program: Yes No
e. Do you anticipate a significant increase in funds or facilities in the coming year? Yes No
f. Change in faculty size anticipated during the coming year (indicate + or - number): _____
g. Change in faculty during current year (+ or - number): _____
5. Does your department participate in a cooperative education program? Yes No Number participating: _____
6. Is your undergraduate curriculum the same as last year? Yes No If no, see addendum
7. Indicate the number of undergraduates who are junior college transfers. _____
8. Please characterize your B.S. academic program(s) by checking the appropriate boxes.
a. Option in a forestry curriculum
b. Separate curriculum in a forestry or other department
c. Curriculum in a WST department
Department name _____
d. Please list options (concentration areas, programs, etc.) within your curriculum: _____

II. EMPLOYMENT OF GRADUATES

1. Indicate the number of graduates for the current academic year employed in the following fields:

Table with 3 columns: B.S., M.S., Ph.D. and rows for Production, Quality Control, Marketing, Sales, Research and Development, Graduate School, Education (other than graduate school), Consulting, Other

2. Indicate the number of graduates (excluding those in graduate school) for the current academic year employed in the following industries:

	B.S.	M.S.	Ph.D.
Lumber	_____	_____	_____
Composition Board	_____	_____	_____
Secondary Manufacture	_____	_____	_____
Forest Industry Suppliers	_____	_____	_____
Building Construction	_____	_____	_____
Plywood	_____	_____	_____
Treating	_____	_____	_____
Pulp and Paper	_____	_____	_____
Other _____	_____	_____	_____

3. Indicate the number of graduates (excluding those in graduate school) for the current academic year employed in the following categories:

	B.S.	M.S.	Ph.D.
Private Industry	_____	_____	_____
Government (Federal, State, Local)	_____	_____	_____
Educational Institutions	_____	_____	_____
Other _____	_____	_____	_____

4. Indicate the number of graduates (excluding those in graduate school) for the current academic year employed in the regions listed below:

	B.S.	M.S.	Ph.D.
New England (ME,NH,VT,CT,MA,RI,NY)	_____	_____	_____
Mid-Atlantic (PA,WV,NJ,DE,DC,MD,VA)	_____	_____	_____
South (NC,SC,GA,FL,TN,AL,MS,LA,TX,OK,AR)	_____	_____	_____
Mid-West (MN,MI,WI,ND,SD,KS,MO,IL,IA,NE,IN,OH,KY)	_____	_____	_____
West (WA,OR,ID,MT,WY,CO,CA,AZ,UT,NV,NM,HI,AK)	_____	_____	_____
Eastern Canada (Manitoba east)	_____	_____	_____
Western Canada (Saskatchewan west)	_____	_____	_____
Outside North America	_____	_____	_____

5. For your graduates securing employment during the current academic year, indicate the average starting salary:

B.S. \$ _____, M.S. \$ _____, Ph.D. \$ _____.

6. What is the current demand/supply ratio for your WST graduates:

B.S. _____ / _____, M.S. _____ / _____, Ph.D. _____ / _____.

7. What do you feel the demand/supply ratio for your graduates will be over the next five years?

B.S. _____ / _____, M.S. _____ / _____, Ph.D. _____ / _____.

III. COMMENTS

FIG. 1. Annual educational questionnaire sent to schools with WST programs.

TABLE 1. *Programs of study in wood science and technology.*

Program	1977-78	1978-79
B.S.	25	25
M.S.	26	27
Ph.D.	24	25

occurred. Louisiana Tech was erroneously classified as a Group IIB program last year, and is in fact a Group VI program.

In addition to the programs listed in the Appendix, graduate programs in allied or specialty fields can be found at several institutions. The Institute of Paper Chemistry has a program in fiber biology; the University of Oregon has a graduate program in their College of Business in forest industry management; and programs in wood chemistry can be found at Montana State University and at SUNY College of Environmental Science and Forestry in the forest chemistry department.

Program resources

No change in the average number of faculty members per program was noted from last year's figures. Schools averaged six faculty members. However, the percent full-time equivalents for teaching dropped from 41% last year to 35% for the 1978-79 academic year. It is anticipated that this trend will continue. A casual glance at advertisements for faculty positions in various journals indicates a large number of open positions. This critical lack of faculty will be more evident when the Ph.D. enrollments are discussed later.

Respondents indicated that current facilities and funding for teaching were adequate, but the majority (88%) did not expect an increase in either during the coming year.

Enrollment

Enrollment in Wood Science and Technology programs is shown in Table 2. Enrollment in all three degree programs for 1978-79 academic year is slightly higher than that predicted last year. Undergraduate enrollment is up 18% and is 2% higher than that predicted. An increase in undergraduate enrollment of 5% is predicted for the 1979-80 academic year. Undergraduate enrollment is somewhat difficult to predict since many schools do not identify majors until the junior year or are, in reality, senior college/graduate schools with only a junior/senior class.

Graduate enrollment increased 3.5%; hence the dim predictions of a year ago failed to materialize. All is not rosy, however. Of the 72 students enrolled in

TABLE 2. *Enrollment in Wood Science and Technology programs.*

Program	Academic Year					
	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80 (Projected)
B.S.	808	909	1,019	1,065	1,256	1,320
M.S.	134	139	163	156	162	162
Ph.D.	76	75	76	70	72	96

TABLE 3. *Enrollment in the typical Wood Science and Technology program.*

Year	% of Total Enrolled	No.
Freshman	16.7	11
Sophomore	19.7	13
Junior	24.2	15
Senior	25.8	16
Sub-total undergraduates		55
M.S.	9.4	6
Ph.D.	4.7	3
Sub-total graduates		9
TOTAL		64

Ph.D. programs, at least half are foreign nationals. This yields a total of nine Ph.D. graduates for the domestic market yearly if all foreign nationals return to their home countries. Even if one-third of these students enter the domestic market, the resultant total of 12 will not be sufficient to replace retirements, mortality, and status changes. Given past enrollment figures, the predicted 33% increase in enrollment forecast for Ph.D. programs in the 1979-80 academic year may be based more on wishful thinking rather than on hard facts.

Enrollment in the typical program is shown in Table 3. Programs averaged 55 undergraduates and 9 graduate students. Of the undergraduates, about 20% were junior college transfers.

With respect to areas of concentration, most undergraduates (67%) opted for the practical, applied programs of study in utilization or business, while most graduate students (56%) were in the R&D program track (Table 4).

An analysis of programs by size and location reveals the same situation as last year (Table 5). Southern, midwestern, and western schools showed small increases in enrollment, while major enrollment gains were made by northeastern and mid-Atlantic schools. Average enrollment in northeastern schools was up 34%. West Virginia University led the 36% increase in enrollment in the mid-Atlantic schools with an enrollment of 128.

EMPLOYMENT

In the 1978-79 academic year, 235 students graduated from B.S. programs, an increase of 4.5% over the previous year. During the same time period, there were

TABLE 4. *Enrollment by area of concentration.*

Area	Undergraduates	Graduates
Wood Science/Engineering	12.2%	55.5%
Wood Utilization	35.0%	33.3%
Business	31.6%	11.1%
Building Construction	7.0%	
Pulp and Paper	3.5%	
Undecided	5.3%	
Other	5.3%	

TABLE 5. *Classification of undergraduate programs by size and region.*

Region	Size			Ave. Enrollment	% Change
	>60	30-60	<30		
NE	3			107	+34
MA	2	1		91	+36
SO		1	5	28	+17
MW	1	3	2	44	+10
W	1	2	2	36	+3

TABLE 6. *Employment by job type—1978.*

Job type	B.S.	M.S.	Ph.D.
Production and Quality Control	47.2% (111)	22.6% (14)	
Marketing and Sales	22.1% (52)	6.5% (4)	
Research and Development	2.6% (6)	25.8% (16)	44.4% (8)
Graduate School	11.5% (27)	30.6% (19)	
Consulting	— (1)		5.6% (1)
Education	— (1)	3.2% (2)	50.0% (9)
Other	15.7% (37)	11.3% (7)	

TABLE 7. *Employment by type of industry—1978.*

Industry	B.S.	M.S.	Ph.D.
Lumber	17.0% (36)	3.3% (1)	6.3% (1)
Composition Board	4.9% (10)	30.0% (13)	6.3% (1)
Plywood	8.5% (18)	6.7% (3)	
Secondary Manufacture	22.0% (46)	6.7% (3)	
Building Construction	4.9% (10)	3.3% (1)	
Pulp and Paper	11.6% (24)	13.3% (6)	12.5% (2)
Treating	1.8% (4)		
Forest Industry Suppliers	6.1% (13)	6.7% (3)	
Other	23.2% (48)	30.0% (13)	75.0% (14)

TABLE 8. *Employment by type of employer—1978.*

Employer	B.S.	M.S.	Ph.D.
Private Industry	93.6% (196)	68.2% (29)	22.2% (4)
Government	1.3% (3)	15.9% (7)	11.1% (2)
Educational Institutions	2.1% (4)	9.1% (4)	66.7% (12)
Other	3.0% (6)	6.8% (3)	

62 graduates from M.S. programs and 18 graduates from Ph.D. programs. Demand for graduates at all levels remains high, with respondents indicating a demand to supply ratio over the next five years of at least 2:1 for graduates. The average salary for B.S. graduates increased 11% to \$13,837, while M.S. and Ph.D. graduates averaged over \$16,000 and \$20,000, respectively.

Graduates from B.S. programs most often found jobs in secondary manufacture

TABLE 9. *Employment by region—1978.*

Region	B.S.	M.S.	Ph.D.
New England	24.6% (52)	4.4% (2)	5.9% (1)
Mid-Atlantic	13.3% (28)	2.2% (1)	5.9% (1)
South	19.4% (41)	30.4% (13)	17.7% (3)
Mid-West	22.8% (48)	21.9% (9)	17.7% (3)
West	19.0% (40)	37.0% (17)	11.8% (2)
Eastern Canada	— (1)		
Western Canada			5.9% (1)
Outside North America		4.4% (2)	35.3% (6)

or in the lumber industry in either production and quality control or marketing and sales. Approximately 11.5% of B.S. graduates continued their education in graduate school (Tables 6, 7, 8). Graduates from Master's programs most often took R&D positions with composition board firms, while the majority of Ph.D. graduates took teaching and research positions with educational institutions.

An analysis of employment by region is somewhat surprising when compared to last year's data and predictions (Table 9). One-quarter of the B.S. graduates located in the Northeast while only 19% located in the West. The other regions were about the same as last year. Most of the M.S. graduates located in the West or South.

Perhaps the shift to the Northeast can best be explained on the basis of job types. A high percentage of jobs in this region were in secondary manufacture. Also, the Northeast is the demographic center of the country and one would expect the percentage of marketing and sales positions to be large in this region. The large percentage of M.S. graduates locating in the South and West can be attributed to the requirements of the composition board and pulp and paper industries in these areas for individuals with greater technical backgrounds.

With respect to Ph.D. graduates, the largest percentage took positions in foreign countries. This is attributable to the large number of foreign nationals in Ph.D. programs and reemphasizes the acute shortage of qualified Ph.D. graduates for the domestic job market.

SUMMARY

The findings for the 1978-79 academic year may be summarized as follows:

- (1) Undergraduate enrollment increased 18% during the past year, while graduate enrollment increased 2%;
- (2) On the undergraduate level, pragmatic courses of study remain the favorite of students;
- (3) Demand and salaries for graduates at all levels remain strong;
- (4) A shortage of qualified Ph.D. graduates exists;
- (5) Employment of B.S. graduates is strong in the secondary manufacture and lumber areas, while composition board claims most M.S. graduates; most undergraduates secure production or marketing positions; M.S. graduates generally enter R&D;
- (6) Ph.D. graduates most often are employed in educational institutions.

REFERENCES

- BARNES, H. M. 1978. Education in wood science and technology: a status report. *Wood and Fiber* 10(4):243-258.
- ELLIS, E. L. 1964. Education in wood science and technology. Society of Wood Science and Technology, Madison, WI. 187 pp.

APPENDIX. *Programs of study in wood science and technology in North America.*

Institution	B.S. ¹	M.S.	Ph.D.
Auburn University Department of Forestry Auburn, AL	Xw	X	X
University of British Columbia Faculty of Forestry Vancouver, BC	Xw	X	X
University of California Forestry and Resource Mgt. Berkeley, CA	Xw	X	X
Clemson University Department of Forestry Clemson, SC	Xw	X	
Colorado State University Department of Forest and Wood Science Ft. Collins, CO	Xw	X	X
University of Idaho Department of Forest Products Moscow, ID	Xd	X	X
University of Illinois Department of Forestry Urbana, IL	Xw	X	X
Iowa State University Department of Forestry Ames, IA	Xf	X	X
Louisiana State University School of Forestry and Wildlife Mgt. Baton Rouge, LA	Xf	X	X
Louisiana Tech University School of Forestry Ruston, LA	Xw		
University of Maine Forest Products Lab. Div. of Forestry Orono, ME	Xw	X	X
University of Massachusetts Wood Technology Section, Forestry and Wildlife Mgt. Amherst, MA	Xw	X	X
Michigan State University Department of Forestry East Lansing, MI		X	X
Michigan Tech University Department of Forestry Houghton, MI	Xw	X	

APPENDIX. *Continued.*

Institution	B.S. ¹	M.S.	Ph.D.
University of Minnesota Department of Forest Products St. Paul, MN	Xd	X	X
Mississippi State University Department of Wood Science and Technology Mississippi State, MS	Xd	X	X
University of Missouri School of Forestry, Fisheries, and Wildlife Columbia, MO	Xw	X	X
State University of New York ESF Department of Wood Products Engineering Syracuse, NY	Xd	X	X
North Carolina State University Department of Wood and Fiber Science Raleigh, NC	Xd	X	X
Oregon State University Department of Forest Products Corvallis, OR	Xd	X	X
Pennsylvania State University School of Forest Resources University Park, PA	Xw	X	X
Purdue University Department of Forestry and Natural Resources West Lafayette, IN	Xf	X	X
Texas A&M University College of Forest and Range Science College Station, TX		X	X
University of Toronto Faculty of Forestry Toronto, ONT	Xf	X	X
Virginia Polytechnic Institute and State University Department of Forest Products Blacksburg, VA	Xd	X	X
University of Washington Division of Physical Science, Wood Utilization Technology Seattle, WA	Xw	X	X
Washington State University Department of Material Engineering—Wood Tech. Section Pullman, WA		X	X
West Virginia University Division of Forestry Morgantown, WV	Xw	X	X

¹ f = programs that exist as an option in a forestry curriculum.

w = programs that exist as a separate curriculum in a forestry or other department.

d = curriculum in a WST department.