

THE FOREST TECHNOLOGY CURRICULUM
AT OREGON COMMUNITY COLLEGES

By
Richard Keith Spring

A PAPER
submitted to
Oregon State University

in partial fulfillment of
the requirements for the
degree of
Master of Forestry
June 1971

TABLE OF CONTENTS

	Page
INTRODUCTION	1
Objective	1
Audience	1
The Forest Technician - Defined	2
METHODS	2
RESULTS	8
The Basic Curriculum	8
The Basic Curriculum Comparison	8
SUMMARY	11
Questionnaire Summary	11
The Forest Technology Curriculum Summary	13
CONCLUSION	14
REFERENCES CITED	16
APPENDIX A - Brief Description of Courses	17
APPENDIX B - Questionnaire Study Report	28

LIST OF TABLES

Table		Page
1	The Basic Curriculum	9
2	The Basic Curriculum Comparison . . .	10
3	Percent of Time Devoted to Various . . Fields of Study According to Curriculum Guides	12

THE FOREST TECHNOLOGY CURRICULUM
AT OREGON COMMUNITY COLLEGES

INTRODUCTION

Forest technician education at the community college is an important segment of the forestry profession (United States Department of Health, Education, and Welfare, 1968).

Objective

The objective of this survey is to investigate the forest technology curricula at Oregon's community colleges. The question of what subjects should be incorporated into a common curriculum for Oregon's Forest Technology programs has been answered by the development of a basic curriculum. Literature reviews, questionnaires, and personal interviews with forest technician instructors were employed to accomplish the objective.

Audience

This paper has been written for those persons who are interested in obtaining knowledge about the community college forest technology curriculum. The paper will provide facts about the Forest Technology program for students interested in forestry, counsellors, forestry instructors, vocational education directors, and other concerned parties.

The Forest Technician - Defined

The explanation which follows is a definition of a forest technician as stated by the SAF (Society of American Foresters) and may be helpful in describing a forest technician's position:

The forest technician is a person competent to occupy a responsible position in the line of authority between the skilled forest worker and the professional forester. He may direct the activities of the former under the supervision of the latter and must apply in a responsible manner proven techniques which are recognized as being professionally sound. The techniques employed demand acquired experience and knowledge of forestry, combined with the ability to work out the details of a task in the light of well established practice.

The forest technician differs from the semi-skilled worker (aide) in his knowledge of forestry theory and methods and from the forester in his more limited or specialized background and in his use of technical skills in support of forestry activities. The senior (advanced) forest technician occupies the area between the skilled forest worker and the forester at the end of the spectrum closest to the professional forester. The forest technician requires an education and training sufficient to enable him to understand the reasons for, and the purposes of, the operations for which he is responsible. He should understand technical terms and appreciate the professional point of view. The forest technician does not need either the depth or extent of scientific understanding required of a forester, but he does need a practical working knowledge of the same subject matter (Society of American Foresters, 1967).

METHODS

In my study a basic forest technology curriculum representative of Oregon community colleges was designed. In

developing my basic curriculum I considered two sets of guidelines, existing curriculums, results of written questionnaires, and my interviews with community college forestry instructors. A brief review of these sources follows.

Two sets of guidelines for the development of Forest Technology programs are included in this report. The SAF drafted the first set of guidelines for forest technician training programs. The purpose of these guidelines is to have a standard for accrediting Forest Technology programs. The Society's minimum guidelines, dated October 16, 1969, was approved by the 1971 SAF Forum of Technical Forestry Training. Backels (1969) prepared the second set of guidelines for a forest technology curriculum. Both sets of recommendations have important features which are relevant in establishing a sound Forest Technology program.

The following minimum guidelines for forest technician training programs have been reprinted through the courtesy of the SAF Committee on Training of Forest Technicians.

October 16, 1969

Minimum Guidelines For Forest
Technician Training Programs*

Objective: To develop persons with competence in forestry at the technician level.

1. The technician program shall be established and operated only after adequate funding for faculty, facilities, equipment, and operation is assured on a continuing basis.

2. Forest technician programs shall be established and operated in liaison with a professional school of forestry or in association with an advisory council alert to technical forestry education and employment situations. The professional school of forestry of the area and the local SAF section shall be asked to be represented on this council.
3. A high school diploma or its equivalent (as defined by each school) shall be required for admission to the program. Retention and graduation standards shall be equal to those of the other technician programs of the school.
4. All forestry courses taught in forest technician programs shall be taught by individuals (preferably with a professional forestry degree) who have thorough knowledge and experience in forestry. The director of the program should be a professional forester.
5. The forest technician program shall offer a minimum training of 800 contact hours of technical training based on experience of existing forest technician schools. An associate degree should be awarded to graduates of the program.
6. The forestry technician faculty shall be separate and distinct from that of the professional school of forestry and shall consist of at least two full time instructors.
7. The forest technician program shall have ready access to and utilization of a reasonable acreage of forested lands suitable for training purposes.
8. The forest technician curriculum shall contain an appropriate combination of forestry, general education and communication skills in order to advance the basic educational level of the individual being oriented toward the forest technician field. The forest technician area shall contain regionally-directed knowledge in the following subject areas (but not necessarily limited to those only): tree and minor vegetation identification, silvics, silviculture, protection, forest measurements (cruising and scaling), land surveying, aerial photography interpretation, forest equipment use, safety, harvesting techniques and utilization, forest land uses and development, management practices, and foremanship. Instruction should include an appropriate combination of formal class and field work instruction. Students should be encouraged to work in forestry positions during summer breaks if provided for in the school schedule.

*These Guidelines have been reviewed and endorsed by the SAF

Committee on Training of Forest Technicians and the American Council of Technical Forestry School Executives.

The next set of guidelines for a forest technology curriculum is a republication from the Journal of Forestry article "Forest Technology: Selected Two-Year Programs And Their Graduates" by Backels (1969).

Guidelines For A Forest Technology Curriculum

1. Professional foresters should teach all forestry courses.
2. The program should be located in an area where forestry and forest-products are important to the economy.
3. Emphasis should be given to field training
4. Close liaison should be maintained with local forestry leaders.
5. Extensive forested areas should be readily available for field instruction.
6. All students should be thoroughly informed of the differing roles of the forest technician and professional forester.
7. Some of the curriculum should be tailored to meet the needs of the geographical area where the program is located. Subject areas which would seem to be most flexible in this regard include forest fire protection, sawmilling, and logging.

The Office of Education in the United States Department of Health, Education, and Welfare (1968) proposed a curriculum outline for the two-year forest technology curriculum. The Department's program is based on the semester system and is a general guideline suitable for the entire United States. My basic curriculum is designed on the term system and is applicable specifically to the Pacific Northwest. The outline from the Office of Education provided a foundation from which to begin my study.

A short description of each course in the basic curriculum was prepared (Appendix A). Most descriptions include a statement of the course objectives, a brief explanation of the course, and a list of instruments or equipment with which students are expected to become familiar.

A comparison was prepared to determine if courses in the basic curriculum were offered at each of Oregon's Forest Technology programs. Community colleges in Oregon which offer the Forest Technology program include:

1. Southwestern Oregon Community College (SWOCC)
2. Clatsop Community College (Clatsop)
3. Lane Community College (Lane)
4. Chemeketa Community College (Chemeketa)
5. Central Oregon Community College (COCC)
6. Umpqua Community College (Umpqua)
7. Mt. Hood Community College (Mt. Hood)

Curriculum and course descriptions of each community college are presented in the college's catalog. Similarity between subjects in my basic curriculum and in community college Forest Technology programs was based on a comparison of course descriptions. The percent of time devoted to various fields of study was also evaluated.

A questionnaire for obtaining specific information about forest technician curricula was mailed Winter Term, 1970 to Oregon community colleges offering the Forest Technology program. Answers to specific questions are in Appendix B.

The following questions were asked:

1. Has industry or government influenced or worked in the development of the forest technology curriculum at your community college:
2. Has industry or government supported your forest technician program through:
 - (a) Buying or helping pay for any forestry related equipment?
 - (b) Providing speakers to give lectures to forestry classes?
 - (c) Cooperating and providing assistance in holding field labs?
 - (d) Relate any other instances of industry or government support?
3. Are any adult education courses in the field of forestry being taught at your community college? If so, explain:
 - (a) What courses are being offered?
 - (b) How are the courses being conducted?
 - (c) The results or success of this type of program.
4. In your opinion what courses of study and other requirements are necessary for a successful forest technician curriculum?

Interviews with forest technician instructors concerning curriculum development were conducted during Winter Term 1970 and 1971. With assistance from these educators a set of guidelines for the development of a forest technology curriculum was assembled. Problems which occurred when interpreting course descriptions from community college catalogs and changes in any community college's forest technology curriculum were clarified

by the instructors.

RESULTS

The Basic Curriculum

Table 1 illustrates the results of the investigation on the development of a basic curriculum. Subjects included are commonly offered in Oregon Forest Technology programs. Courses have been separated into terms in which the courses would be taught. Flexibility could be interjected in the basic curriculum by offering some classes more than once during the school year. The schedule also includes the number of credit and class hours (lecture and lab) required per week. During his two years at the community college the forest technician student accumulates 100 credit hours.

The Basic Curriculum Comparison

A comparison of the forest technology curricula at Oregon community colleges and my basic curriculum is presented in Table 2. The table shows a separation of basic curriculum courses into three groups: (1) General education and supporting technologies, (2) Core forestry, and (3) Other forestry. The percent of the seven community colleges sampled which offer each course listed in the basic curriculum is located on the right side of the table. The percentage at the bottom of the table compares the total curriculum of each community college to my entire basic curriculum.

Table 1. The Basic Curriculum

<u>Courses</u>	<u>Credits</u>	<u>Hours Per Week</u>		
		<u>Class</u>	<u>Lab</u>	<u>Total</u>
First Term				
Communication Skills I	3	3	0	3
Fire Control	3	2	3	5
General Forestry	3	3	0	3
Math I	3	3	0	3
Office Machines	3	2	2	4
Technical Drawing	2	0	4	4
	<u>17</u>	<u>13</u>	<u>9</u>	<u>22</u>
Second Term				
Communication Skills II	3	3	0	3
Forest Botany	3	2	3	5
Forest Surveying I	4	2	5	7
Forestry Tools & Equipment	2	1	3	4
Health Education Elective	3	3	0	3
Math II	3	3	0	3
	<u>18</u>	<u>14</u>	<u>11</u>	<u>25</u>
Third Term				
Forest Measurements I	3	2	4	6
Forest Surveying II	3	2	4	6
Math III	3	3	0	3
Technical Report Writing	3	3	0	3
Tree Identification	3	1	4	5
	<u>15</u>	<u>11</u>	<u>12</u>	<u>23</u>
Fourth Term				
First Aid-Accident Prevention	3	2	2	4
Introduction to Business	3	3	0	3
Route Surveying	4	2	5	7
Silviculture I	3	2	4	6
Timber Harvesting	4	2	5	7
	<u>17</u>	<u>11</u>	<u>16</u>	<u>27</u>
Fifth Term				
Elements of Supervision	3	3	0	3
Forest Contracts	3	2	3	5
Forest Measurements II	3	2	4	6
Forest Products Utilization	3	2	3	5
Psychology of Human Relations or Social Science Elective	3	3	0	3
Silviculture II	3	2	4	6
	<u>18</u>	<u>14</u>	<u>14</u>	<u>28</u>
Sixth Term				
Aerial Photo-Interpretation	3	2	4	6
Forest Protection (Biotic)	3	2	2	4
Forest Recreation	3	2	4	6
Senior Project or Seminar	3	2	3	5
Wildlife Resources	3	2	3	5
	<u>15</u>	<u>10</u>	<u>16</u>	<u>26</u>

Total = 100 Credits

Specific Courses		Where Courses Are Offered							Percent of Colleges
General Education and Supporting Technologies:									Mean = 66
Communication Skills I	= SWOCC	Clatsop	Lane	Chemeketa	COCC	Umpqua	Mt. Hood	=	100
Communication Skills II	= SWOCC	Clatsop	Lane	Chemeketa		Umpqua	Mt. Hood	=	86
Math II	= SWOCC	Clatsop	Lane		COCC	Umpqua	Mt. Hood	=	86
Technical Drawing	=	Clatsop	Lane	Chemeketa	COCC	Umpqua	Mt. Hood	=	86
Elements of Supervision	=	Clatsop		Chemeketa	COCC	Umpqua	Mt. Hood	=	71
Math I	= SWOCC	Clatsop		Chemeketa	COCC	Umpqua		=	71
Technical Report Writing	=	Clatsop		Chemeketa	COCC	Umpqua	Mt. Hood	=	71
Introduction to Business	= SWOCC		Lane	Chemeketa			Mt. Hood	=	57
Math III	=		Lane		COCC	Umpqua	Mt. Hood	=	57
First Aid-Accident Prevention	=		Lane	Chemeketa	COCC			=	43
Health Education Elective	=	Clatsop	Lane				Mt. Hood	=	43
Office Machines	=	Clatsop		Chemeketa		Umpqua		=	43
Psychology of Human Relations	= SWOCC			Chemeketa	COCC			=	43
Core Forestry:									Mean = 84
Forest Measurements I	= SWOCC	Clatsop	Lane	Chemeketa	COCC	Umpqua	Mt. Hood	=	100
Forest Measurements II	= SWOCC	Clatsop	Lane	Chemeketa	COCC	Umpqua	Mt. Hood	=	100
Forest Surveying I	= SWOCC	Clatsop	Lane	Chemeketa	COCC	Umpqua	Mt. Hood	=	100
Tree Identification	= SWOCC	Clatsop	Lane	Chemeketa	COCC	Umpqua	Mt. Hood	=	100
Aerial Photo-Interpretation	= SWOCC	Clatsop		Chemeketa	COCC	Umpqua	Mt. Hood	=	86
Forest Surveying II	= SWOCC	Clatsop		Chemeketa	COCC	Umpqua	Mt. Hood	=	86
Route Surveying	= SWOCC	Clatsop	Lane	Chemeketa	COCC	Umpqua		=	86
Silviculture I	= SWOCC	Clatsop	Lane		COCC	Umpqua	Mt. Hood	=	86
Fire Control	=	Clatsop	Lane	Chemeketa	COCC	Umpqua		=	71
Forest Protection (Biotic) ¹	=	Clatsop	Lane	Chemeketa ²	COCC	Umpqua		=	71
Silviculture II	= SWOCC	Clatsop				Umpqua		=	43
Other Forestry:									Mean = 70
Forest Products Utilization	= SWOCC	Clatsop	Lane	Chemeketa	COCC	Umpqua	Mt. Hood	=	100
Forest Recreation	= SWOCC	Clatsop	Lane		COCC	Umpqua	Mt. Hood	=	86
General Forestry	= SWOCC	Clatsop	Lane	Chemeketa	COCC	Umpqua		=	86
Timber Harvesting	= SWOCC	Clatsop	Lane	Chemeketa	COCC		Mt. Hood	=	86
Forest Botany	= SWOCC				COCC	Umpqua	Mt. Hood	=	57
Forestry Tools & Equipment	=	Clatsop	Lane	Chemeketa	COCC			=	57
Senior Project or Seminar	=	Clatsop	Lane		COCC	Umpqua		=	57
Wildlife Resources	= SWOCC				COCC	Umpqua	Mt. Hood	=	57
Forest Contracts	= SWOCC		Lane		COCC			=	43
% of Total Basic Curriculum		67	79	70	70	85	79	64	

1. SWOCC and Mt. Hood have combined Fire Control and Forest Protection (Biotic) into one course.

2. Chemeketa's Forest Protection course includes forest pathology only.

The percent of time devoted to various fields of study in Forest Technology programs is presented in Table 3. The SAF Committee on Training of Forest Technicians (1970) supplied me with the percent of time devoted to various fields of study for states with Forest Technology programs in the Pacific Northwest. To provide a breakdown for Oregon I have calculated the percent of time devoted to the various studies according to curriculum guides for Oregon community college Forest Technology programs. The percent of time in my basic curriculum devoted to each field of study listed in the table has been determined and placed in the table for comparison. A high correlation for time devoted to the various fields of study exists between my basic curriculum and curriculums of other community colleges.

SUMMARY

Questionnaire Summary

Private industry and government agencies seem to be quite involved in the development of the technician program and provide ample assistance in forest technology education through guest speakers and aid in laboratory exercises. Neither government nor industry has directly provided financial assistance for the purchase of equipment, but through indirect help by other means have greatly supported the technician program.

Adult education in the field of forestry varies to a large extent depending upon the particular community college. Nearly all the forest technician instructors indicated an

Table 3. Percent of Time Devoted to Various Fields
of Study According to Curriculum Guides

<u>Forest Technology Schools</u>	<u>Forest Technology</u>	<u>Engineering</u>	<u>Communications</u>	<u>Math</u>	<u>Science</u>	<u>Social Science</u>	<u>Other or Elective</u>
Washington Schools	52	11	8	7	9	4	9
Oregon Schools	51	12	9	9	5	7	7
California Schools	50	5	11	10	8	9	7
Other	40	15	10	9	8	5	13
<u>All Schools Average</u>	<u>48</u>	<u>11</u>	<u>9</u>	<u>9</u>	<u>8</u>	<u>6</u>	<u>9</u>
<u>My Basic Curriculum</u>	<u>51</u>	<u>11</u>	<u>9</u>	<u>12</u>	<u>-</u>	<u>6</u>	<u>11</u>
Central Oregon	60	12	9	10	-	3	6
Chemeketa	42	10	9	7	11	11	10
Clatsop	47	12	12	9	3	9	8
Lane	54	11	8	6	-	3	18
Mt. Hood	41	11	9	6	-	6	27
Southwestern Oregon	45	10	10	13	-	10	12
Umpqua	45	15	8	22	-	5	5

interest in this field and said that if the need were presented by industry or government for a specific course, it would be offered. From talking with several instructors I found that when a course is scheduled in adult education for graduate foresters or technicians the demand far exceeds the capacity of the class in a very short time after the community is informed. Because these adult education courses are well received, the instructors indicated that involvement in this area will increase as specialized personnel are found to teach the courses.

Forest technology instructors gave their opinion that for a successful technician program to develop there should be, first, a wide variety of practical laboratory experience available for the technician; second, a summer of employment in the field of forestry between the first and second year is essential, and third, the curriculum which can be offered depends on the area where the community college is located and where the students will be employed.

Forest technician instructors seem to have two outstanding characteristics which are essential for the betterment of their profession: these assets include the ability to be flexible in relation to their curriculums and an evident enthusiasm about their program.

The Forest Technology Curriculum Summary

Many of the courses proposed in my basic curriculum are offered at most Oregon community colleges with Forest

Technology programs. All of the seven community colleges in the sample offer some courses which are not included in my basic curriculum and some of the schools require more credit hours for graduation than suggested in my curriculum. The Forest Technology program at the community college is activity oriented and the student spends much of his school time in labs. during completion of the two-year curriculum.

The forest technology curricula in Oregon community colleges were used for comparison with my basic curriculum. Several of the community colleges in Oregon offer options to the curriculum of Forest Technology. The options which are available for forest technology students include: 1. Clatsop Community College - a Business-Forestry option; 2. Chemeketa Community College - a Forest Products Technician option; 3. Central Oregon Community College - a Range Management and a Forest Surveying option, two of the three options are required; and 4. Umpqua Community College - a Forest Recreation option.

CONCLUSION

A forest technology curriculum should be designed to supply the needs of the employer. Part of the curriculum may be fashioned to the geographic features of the region in which the community college is located. The advisory boards of Forest Technology programs are essential in selecting courses to be offered at the local community college. Practical laboratory experience in forest technology courses should be

stressed. Ecological relationships between courses in the Forest Technology program should also be emphasized. A summer of forestry related work experience would complement the student's formal education and should be encouraged by forestry instructors. The professional forester and the forest technician have separate rules in the forestry profession.

Throughout his two years of education at the community college the technician should be informed of his duties as a skilled forest worker and he should also gain an understanding about the responsibilities of the professional forester. Well trained forest resource technicians promote more efficient use of manpower to get the land management job done. The technical skills acquired at the community college enables the forest technician to be a valuable asset to the professional forest manager, scientist, or ecologist.

REFERENCES CITED

- Backels, John F. 1969. Forest Technology: selected two-year programs and their graduates. *Journal of Forestry* 67:800-802.
- Blenis, H. W. 1969. Training of forest technicians - curriculum assessment. *Journal of Forestry* 67:248-249.
- _____. 1965. The Maritime Forest Ranger School and its place in Canadian forestry education. Boston, 1965. 2op. (New England Section Meeting of the Society of American Foresters, 1965, Proceedings).
- Garratt, G. A. 1968. Education faces the challenge. *Journal of Forestry* 66:551-555.
- Society of American Foresters Committee on Training of Forest Technicians. Forest technician training programs in the United States - a progress report. *Journal of Forestry* 65:484-487, 1967.
- Society of American Foresters Forum of Technical Forestry Training. Proceedings of the 1970 Society of American Foresters Forum of Technical Forestry Training. Portland, Oregon. February 13 and 14, 1970.
- Society of American Foresters Forum of Technical Forestry Training. Proceedings of the 1971 Society of American Foresters Forum of Technical Forestry Training. Portland, Oregon. March 12 and 13, 1971.
- U.S. Department of Health, Education, and Welfare. Office of Education. 1968. Forest Technology - a suggested 2-year post high school curriculum. U.S. Government Printing Office, 1968. 142p. (DE-80054).

A P P E N D I X

APPENDIX A

Brief Description of Courses

A short description of each course in the basic curriculum has been prepared through a review of course descriptions in catalogs from Oregon community colleges. The description of each course usually includes a brief explanation of the course, a list of instruments or equipment with which students are expected to become familiar, and a statement of the objectives of the course.

First Term

Communication Skills I

A course stressing the importance of communications activities. Emphasis is given to improving the student's ability to write, speak, read, and listen effectively. The purposes and organization of many communications are emphasized. Attention is given to the recognition of thinking as a means to effective communications. Particular attention is given to exposition and techniques used in exposition. Sentence and paragraph development receive special attention. The student becomes acquainted with such literary forms as poetry, the novel, the short store, and drama.

Fire Control

An introductory course in Fire Control. Fire will be discussed as it relates to prevention, pre-suppression, and suppression techniques and the basic principles of forest fire behavior. Consideration of the effects which fuels, weather, and topography have on forest areas are presented. Planning and organizing presuppression methods and implementing suppression techniques in common use will be covered. Use of hand tools, portable pumps, motorized apparatus, aircraft and helicopters.

chemicals, and other related equipment in the suppression effort are studied. Objectives of the course include: to develop an understanding of the factors involved in fire prevention and suppression, to realize some of the characteristics about fire behavior and how forest fires are fought, to develop the ability to carry on and supervise forest fire fighting procedures.

General Forestry

A course designed to orient the beginning student in a forest technology program. The course presents an introduction and overall picture of forestry in the United States. Consideration is given to the broad historical development of forestry in the United States, to forest terminology, to forest protection, to harvesting timber crops, to reforestation, to forest policy, to forest products, and to multiple-use management of the forest resource as pertains to forest technology. Forest organizations at the private and governmental level are examined. A survey will be made of the various kinds of occupations for forest technicians, the demand and opportunities for technicians, and the future trends in forestry. Numerous industry, state, and federal representatives are invited to speak. Further training is facilitated by showing training films in all multiple-use aspects.

Math I

Emphasis is on the foundations and structure of arithmetic. Goals of the course are to equip the student to handle everyday arithmetic problems and to lay a foundation for the student who plans to take algebra. This is a course in practical mathematics including problems composed of whole numbers, fractions, measurements, formulas, graphs, roots, and tables and interpolation.

Office Machines

A course for students in technical programs. Students are trained in the use of the electric and manual office-type adding machines and calculators. Nomenclature, care, and operation of office machines is covered. A brief introduction to the procedures and applications of

computer analysis in forestry is given. The lab. course is designed to provide for practical application and problem solving using basic mathematical concepts.

Technical Drawing

A fundamental course in drafting designed to give the student a basic understanding of drawing techniques. The principal objectives are to introduce a basic understanding of the application of drafting instruments, standard orthographic projection, layout procedures, engineering lettering, graphs and charts, and topographic and contour maps. Freehand lettering and topographic drawing are stressed as requirements for map drafting and forest management activities.

Second Term

Communication Skills II

This course is a continuation of the processes of improving the student's speaking, reading, writing, and listening skills, with emphasis on speaking. The student also receives further introduction to literature. Practice is provided for the student in applying the basic communication skills. Group discussions, individual speaking situations, written communications, and listening situations receive special emphasis.

Forest Botany

The course will basically cover how plants get their food, grow, differentiate, and reproduce. Elements associated with keys of plant identification will be learned. Botanical characteristics of forest range plants, shrubs, and trees will be emphasized. Objectives are to develop in the student an appreciation and understanding of the wide variety of plants, how they obtain their food, grow, and reproduce. It is hoped that the student will have a better concept of the relationship of plants to the world around him. Goals will be met by observation, experimentation, and study of living plants, prepared slides, models, books, and by discussion.

Forest Surveying I

A beginning course in surveying techniques designed to give the student an understanding of the fundamentals of chaining and leveling, care and adjustment of surveying instruments, and office procedures. The student is trained in the use of hand compasses, staff compasses, two-chain tapes with trailer, abney levels, and aneroid barometers. Classwork covers the theory of field measurement, bearings, angles, azimuths, and distances; declination problems; the public land survey system; field note forms, and forest mapping procedures.

Forestry Tools and Equipment

A practical course in the actual operation and safe use of hand tools and power equipment; sharpening edged tools; and first aid and safety in the woods. Hand tools studied will include brush hooks, machetes, hammers, saws, files, brace and bit, square, wrenches, axes, pulaskis, hazel hoes, shovels, and back pumps. Power tools include power sprayers, drills, chain saws, portable fire pumps, brush cutting "disc type" saws, automobiles, trucks, and two-wheeled motor vehicles.

Health Education

Personal health problems of men and women with emphasis on implications of family life. Mental health, communicable diseases, degenerative diseases, and nutrition are also covered.

Math II

This is a course in practical mathematics for skilled workers, including the fundamentals of applied algebra and applied geometry. The algebra consists of symbols, functions, ratios and proportions, exponents, radicals, and linear and quadratic equations. The geometry portion of the course includes geometric lines and shapes, and common geometric constructions.

Third Term

Forest Measurements I

A course in the methods of cruising standing timber, including strip, fixed plot, and variable plot techniques; and the procedures of forest inventory. Tree measurements, cull and breakage estimates, sampling procedure, and data compilation are learned. The objective of the course is to prepare the technician to measure the volume of various stands of timber, the quantity of the stand, and the stand's rate of growth. The student studies the various methods of timber cruising and puts this knowledge to work in actual field practice.

Forest Surveying II

Instruction in the use and care of higher precision surveying instruments and equipment. The course is designed to familiarize the student with the engineer's transit and its uses, and an introduction to stadia surveying and leveling. The course includes use of the following equipment: dumpy levels, transit, theodolites, and plane table.

Math III

This is a course in trigonometry, elementary algebra through quadratics, logarithms, and related practical mathematics with applications peculiar to the vocational-technical field. The trigonometry portion of the course begins with an introduction to trigonometric ratios of an acute angle and ends with the law of cosines.

Technical Report Writing

A study of the principles of composition as they apply to writing reports required in the technical and business professions. The subjects covered are: why reports are written, types of reports, make-up of reports, effectiveness of writing styles, gathering of facts for a report, planning a report, method of writing a report, layout and typing a report, and visual aids in a report.

Tree Identification

A basic course in the identification of woody plants found in the local region. The botanical features of the major forest species will be examined as

well as the ecological features in their range. Specific identification of Douglas-fir, true firs, hemlocks, spruces, pines, and "true cedars" as well as some broadleaf trees as, for example, alders, maples, oaks, and various other minor species and shrub-type species are included.

Fourth Term

First Aid-Accident Prevention

Study and practice of emergency treatment for a wide variety of injuries; artificial respiration, control of bleeding, proper methods of transportation, splinting and bandaging, and care for poisoning. Also a study of accident prevention, recognition of hazards, good housekeeping, and personal protective equipment. Course leads to a Red Cross Standard Certificate.

Introduction to Business

A basic background course in the general fields of business aimed at developing an awareness of the nature of business in the capitalistic system. Included are the problems of ownership, organization, personnel, finance, marketing, and managerial and government control. Discussion of various forest enterprises will be presented by guest speakers.

Route Surveying

This course in highway route design is concerned with the effects of traffic and vehicular characteristics on road design, length of highway, curvature and elevation of roadbeds as they affect costs and locations; geometric design; field and office practice in route and curve layout; earthwork computations, profiles, grades and cross-sections; bridge construction; and the principles of aerial photography applied to highway route design. The objective of the course is to give the student an appreciation for sound roadbuilding practices in forest road layout and design. Laboratory projects will include the actual design of a road.

Silviculture I

A study of silviculture as related to functions performed by the forest technician. Silvicultural practices covered include thinnings, prunings, special cuttings, salvage cuttings, and release cuttings. The study of silvicultural practices includes experience in the marking of stands prior to thinning. Major silvicultural systems such as clear-cutting, seed tree method, shelterwood method, selection method, and vegetative or coppice methods of reproduction are learned. Combinations successful in the Pacific Northwest region are studied in detail. Field trips are an important part of this course.

Timber Harvesting

This course gives the student a first-hand view of logging in the Pacific Northwest. Instruction covers systems of logging, physical and economic problems, and safety. Field trips will view felling, bucking, yarding, loading, hauling, dumping, and rafting operations as well as related activities such as road building and maintenance of equipment. The student will develop a logging plan for a small undeveloped tract of land, included will be preparation of a road system and logging methods. The interrelationships between harvesting methods, silviculture, and general forest management will be considered.

Fifth Term

Elements of Supervision

A course designed to make the forestry technician better able to understand the problems relative to small and moderate size crews of men from the standpoint of the member of the crew and the foreman in charge of the crew. The course will cover all aspects of supervision such as leadership, ways of avoiding friction within the crew, organization, crew efficiency and morale, communications, handling of equipment issued to crews, job training, safety factors, employee performance appraisal, individual differences, sound decision making, grievances, disciplinary action, and employee-management relations.

Forest Contracts

The course deals with the basic forms of forest contracts and their functional administration. The course will study timber sale contracts, timber sale administration, land appraisal, timber appraisal, right-of-way acquisition, trespass procedures, enforcement of contracts through regular in-the-forest inspection, sellers' and purchasers' problems, basic forest operating laws, and an introduction to forest regulation and forest management plans. The objective of the course is to give the student a basic understanding of how the forest contract relates to management objectives and the problems encountered in contract administration.

Forest Measurements II

An applied course in the techniques of measuring and grading logs according to accepted procedures by the agencies engaged in scaling. The course includes practice scaling in the mill yard, observation of scaled logs as they are sawed into lumber, and practice scaling in the woods. Log rules, scaling practices, defect deductions, and grading of logs in the standing tree are studied. Log grading portion of the course consists of grading officially graded trees as a training procedure and grading additional graded and ungraded trees to develop experience. Demonstrations by area personnel currently employed in this type of work are a part of the instructional sequence.

Forest Products Utilization

The course will cover the basic forms of forest products derived from the timber resources and how they relate to the economy. Emphasis will be on types of products obtained, their properties and uses; manufacturing processes; and the relative importance of forest products to our economic system. Laboratory projects will include trips to plants engaged in the production of plywood, shingles, poles, pulp, paper, lumber, chemically derived products, piling, timbers, furniture, particle board, and special products. The objective of the course is to provide students with a background and appreciation of the various wood products produced from the forest resource. An understanding of the flow of these products from resource to consumer will also be learned.

Psychology of Human Relations

A course designed to give the student an understanding of himself and others and to aid him in understanding the fundamental psychological principles that are significant in life and work. Motivation, feelings and emotions, and learning are considered with particular reference to the application to on-the-job problems. Other topics investigated are: intelligence and aptitude tests, employee selection, supervision, job satisfaction, and industrial conflict as they relate to the employee and his work situation. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.

Silviculture II

An introduction to the artificial reforestation and natural reforestation practices in the United States. Two subjects which are studied include the establishment of forest stands through the natural regeneration methods of reproduction cutting and application of chemical spraying in site preparation and regeneration release. Artificial reforestation through planting and seeding procedures are analyzed. Nursery techniques, seed collection, species selection and other developments in selection and control of species are learned. Laboratory and field exercises are emphasized.

Aerial Photo-Interpretation

An introductory course to the basic skills of interpretation on aerial photos. The course covers the practical use of aerial photos for forestry use. The study begins with the principles of aerial photography, and stereoscopic viewing; proceeds to photo-interpretation, scale determination, displacement calculations, acreage measurement, object heights and other stereoscopic measurements; and concludes with studies of applications in radial line plotting, forest type mapping, control methods for aerial surveys, projection of photo detail to base maps, timber volume estimation from aerial photos, and application of aerial photos to forest engineering.

Forest Protection (Biotic)

Instruction covers the identification and control measures for forest insects, diseases, fungi, and animals as they relate to forest damage. The effect these damaging agents have on forest growth will be studied. Methods of prevention and control to decrease damage from these forces will be analyzed. Relationship of these factors with timber cruising is also examined. The objective of the course is to give the student a broad understanding of the various biotic agents which can attack forests.

Forest Recreation

An introductory course in outdoor recreation which will cover the needs and demands of the general public to the use of forest resources for recreation. The economic factors involved in recreation as well as the planning and design of recreational facilities will be discussed. Forest lands recreation including history, public relations, site evaluation, site planning, location, campground and picnic area design, installation of recreational structures, and sanitation management are learned to enable the technician to assist in the implementation of recreation plans. The objective of the course is to provide the student with an awareness of the increasing demand for forest recreation. The laboratory will include inspection and analysis of recreational areas in existence and consideration in planning of areas which might be developed.

Senior Project or Seminar

The second year forestry student is expected to undertake a special study of an activity in his field of forest technology or related subjects. A seminar may also be conducted on the most recent trends and problems of forestry practices and technology. Guest speakers would supplement the seminar.

Wildlife Resources

This is an introductory course in wildlife ecology upon which the management of our wildlife resources is based. It is intended as a rounding-out process for the forest technician to assist in

matching his forest management practices and basic ecological ideas with wildlife management practices. The study of wildlife resources will include reproductive potential; environmental resistance; man's manipulation of numbers; management strategy; census taking techniques; and habitat requirements of upland game, fur bearers, predators, waterfowl, and fish. Reduction of damage to forest crops by wildlife will also be considered.

APPENDIX B

Questionnaire Study Report

1. Has industry or government influenced or worked in the development of the forest technology curriculum at your community college?

Southwestern Oregon Community College

The industrial and government forestry organizations have a very important and vital role in the Forest Technology program in the following ways:

1. Provide employment for graduates
2. Provide speakers in specialized areas of forestry
3. Serve as a committee on evaluation of the subject matter of the curriculum
4. Cooperate in financing tuition and fees for their employees to attend specialized courses offered at the community college

Central Oregon Community College

Industry has had little to do with the development of our curriculum although one forester for a private timber company was on our advisory board for several years. Most of our advisory board personnel have been United States Forest Service people and almost all of our graduates have gone to work for the USFS. Thus, their needs have pretty-well dictated our curriculum. We have had a representative from the State of Oregon Forestry Department on our advisory board

at various times. Thus, some ideas from the State organization have influenced our curriculum slightly. We have reacted to private industry needs primarily in our course in logging only since industry has not hired many of our foresters in the past.

Umpqua Community College

Both industry and government employees are on a Forestry Advisory Committee that meets with us three times each year to review what we are doing. Course content is covered and if any course is to be dropped or added they have to approve it.

Lane Community College

Both industry and government have assisted to a great extent. Our advisory committee is about one-half industry and one-half government personnel. Both industry and government agencies held on a continuing basis with field trips and work areas.

Clatsop Community College

Yes, both public (Oregon State Forestry Department) and private industry (Crown Zellerbach and Scaling Bureaus) people are on the advisory committee.

Chemeketa Community College

Yes. Our program is guided and aided by members of the advisory committee for the program. This committee has representatives from the United States Forest Service, Bureau of Land Management, State Forestry Department, Columbia River Log Scaling And Grading Bureau, Timber Engineering Company, and at

least five members from industry.

Mt. Hood Community College

We have two Forest Service men and one Bureau of Land Management man plus two men from industry on our advisory committee.

2. Many community colleges have facilities and equipment far superior to those found in state universities. Has industry or government supported your forest technician program through:

- (1) Buying or helping pay for any forestry related equipment?

Southwestern Oregon Community College

No.

Central Oregon Community College

Industry has not helped furnish equipment. The U.S. Government (through MDTA) did supply most of our original equipment. Since 1966 we have purchased as much (or more) with District funds.

Umpqua Community College

We have had some federal money in the past but now all the money we get is local.

Lane Community College

No.

Clatsop Community College

No.

Chemeketa Community College

Yes - by allowing a good discount on purchases.

Mt. Hood Community College

No.

2. Has industry or government supported your forest technician program through:

(2) Providing speakers to give lectures to forestry classes?

Southwestern Oregon Community College

Yes. Both areas have been extremely cooperative in providing their specialized field personnel to cover certain areas of study.

Central Oregon Community College

Industry has provided a limited number of speakers. USFS, State Game Commission, Bureau of Land Management, Soil Conservation Service, etc. have supplied many speakers.

Umpqua Community College

Many USFS and Bureau of Land Management employees have come in to give talks in their fields.

Lane Community College

The answer to question 2-2 is too lengthy and examples too numerous to detail. I have never been refused speaker assistance. We probably average four speakers per term.

Clatsop Community College

Both public and private forest industries assist and

cooperate by having their personnel speak to our classes.

Chemeketa Community College

Yes - providing ample lead time, we have not had any refusals to requests for guest lectures or speakers.

Mt. Hood Community College

No.

2. Has industry or government supported your forest technician program through:

- (3) Cooperating and providing assistance in holding field labs.?

Southwestern Oregon Community College

Industry and government open up their offices, mills, and timberlands for various laboratory exercises.

Central Oregon Community College

Industry and government agencies have both provided much assistance in conducting field labs. (Sawmills, plywood, paper, logging) - private assistance; (Watershed, recreation, silviculture, range management, aerial photo-interpretation, etc.) - government assistance.

Umpqua Community College

Many USFS and Bureau of Land Management employees give talks in their fields.

Lane Community College

The answer to question 2-3 is too lengthy and examples

too numerous to detail. I have never been refused field trip assistance. We probably average four or five field trips per term.

Clatsop Community College

Both public and private forest industries assist us on field projects (e.g., cruising, scaling, and surveying) by letting us use their facilities and often letting the students spend a day or two each term actually working as part of a crew.

Chemeketa Community College

Yes - we take many field trips to various industry plants and logging operations. Most companies are very generous with time and personnel for tours and special labs such as log scaling. The State and Federal government agencies held with the Fire Simulator and other unique demonstrations.

Mt. Hood Community College

Both industry and government agencies are very co-operative regarding field labs.

Question 2.

- (4) Please relate any other instances of industry or government support or cooperation.

Central Oregon Community College

The United States Forest Service has supported our program by providing many opportunities for summer employment and (USFS and State) have hired all our graduates who have desired work. United States Forest Service has also supplied

many manuals, training sessions, etc.

Umpqua Community College

We have permission to hold some field labs on Bureau of Land Management land parcels.

Chemeketa Community College

Western Wood Products conducted a special evening course on lumber grading at no cost and also included furnishing the necessary lumber for grading lab.

Mt. Hood Community College

Literature and films are provided when requested.

3. Are any adult education courses in the field of forestry being taught at your community college? If so, explain:

- (1) What courses are being offered?
- (2) How are the courses being conducted?
- (3) The results or success of this type of program?

Southwestern Oregon Community College

Yes, "Intermediate Forest Measurements." This course offers two visiting lecturers. "Wildlife Management" and "Silviculture" are being planned to be offered this Spring. The results, thus far, are very favorable.

Central Oregon Community College

None (except) we did run a 4-hour review course one morning on drafting fundamentals when asked to do so by the United States Forest Service.

Umpqua Community College

The only Forestry course offered in adult education is Log Scaling. It is taught by Earl Moar, Head of the Southern Oregon Log Scaling and Grading Bureau. The class meets one time a week for three hours for seven weeks and three Saturday Log Scaling trips. Next term Forest Soils is being offered.

Lane Community College

None have been offered.

Clatsop Community College

Yes, (1) Night courses - (Photogrammetry - Cruising - Surveying Principles), (2) These are set up to meet any demand so long as there are 10 or more students, (3) Good success - industry is paying the student's fees many times.

Chemeketa Community College

No, we are not now offering any adult courses. In Spring Term of last year we offered a course on genetics in cooperation with the SAF. There were 11 students enrolled who completed the course.

Mt. Hood Community College

None are being offered.

4. In your opinion what courses of study and other requirements are necessary for a successful forest technician curriculum?

Southwestern Oregon Community College

The chief requirement is to produce a good product with

the technical skills to be highly employable. A wide variety of practical laboratory experience is also necessary as well as worthwhile employment between the first and second year of study.

Central Oregon Community College

It depends upon the area in which the school is located and where the students will be employed. All students need:

1. Log scaling and grading
2. Cruising
3. Surveying (compass, transit, etc.)
4. English and speech
5. Math (including some trigonometry)
6. Crew Management
7. Some Botany and Soils (in some fashion)
(We include it in range management, watershed, silviculture, etc.)
8. Silviculture
9. Aerial Photo-Interpretation
10. Recreation
11. Wildlife Habitat Management (range management is useful here)
12. Watershed Management
We emphasize a lot of range management because of where our boys work.

Clatsop Community College

Lots of practical experience or lab and field exercises.

Chemeketa Community College

Industry has indicated that they are looking for a generalist, a man with wide experiences. The general education courses are equally as important as the technical courses. By completing the program a graduate indicates an interest and commitment to his field, a trait necessary for a foreman or supervisor in any industry.

Mt. Hood Community College

The majority of students are deficient in math and English - which we have attempted to correct. The forestry courses - excluding the sciences - we feel are broad enough to successfully train our technicians. This is especially true of lab courses. All appear to grasp the problem "by doing" rather than extensive lecturing.