

2007 Mississippi Curriculum Framework

Postsecondary Forestry Technology

(Program CIP: 03.0511 – Forest Technology/Technician)

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Standards in this document are based on information from the following organizations:

SAF Standards

Industry standards referenced were adapted from *Standards and Procedures for Recognizing Educational Programs in Forest Technology*, as published by the Society of American Foresters.
<http://www.safnet.org/education/TechRecStd121604.pdf>

Related Academic Standards

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Preface

Postsecondary Forestry Technology Research Synopsis

Articles, books, Web sites, and other materials listed at the end of each course were considered during the revision process. The Society of American Foresters Web site and educational program standards were especially useful in providing insight into trends and issues in the field. Suggested references were detailed for use by instructors and students during the study of the topics outlined.

Industry advisory team members from community and junior college advisory committees throughout the state were asked to give input related to changes to be made to the curriculum framework.

Instructors from all five community and junior college forestry programs in the state, as well as a representative of the School of Forest Resources at Mississippi State University, met to review the curriculum.

Curriculum

The following national standards were referenced in each course of the curriculum:

- CTB/McGraw-Hill LLC *Tests of Adult Basic Education, Forms 7 and 8 Academic Standards*
- *21st Century Skills*
- The *Society of American Foresters* has developed curriculum content standards for postsecondary forestry technology programs. These standards were used to insure that content in the courses is current with industry expectation.

Industry and instructor comments, along with current research, were considered by the curriculum revision team during the revision process; changes were made as needed and appropriate. Many of the skills and topics noted in the research were already included in the curriculum framework. Specific changes made to the curriculum at the May 24, 2006, curriculum revision meeting included:

- Competencies and objectives were reviewed to ensure accuracy and appropriateness.
- Suggested references for teaching each course were added including textbooks and print materials, Web sites, journals, and video presentations.
- Competencies and suggested objectives were correlated to the content standards for postsecondary forestry technology programs as published by the Society of American Foresters.
- The Recommended Tools and Equipment list was updated.

Assessment

Students will be assessed using the *Postsecondary Forestry Technology MS-CPAS2 Test*.

Professional Learning

It is suggested that instructors participate in professional learning related to the following concepts:

- Use of Spatial Information Technology in Forest Management

- New and innovative methods of forest management
- Use of the Mississippi Agriculture Education B.R.I.D.G.E. site on Blackboard®
- Differentiated instruction – To learn more about differentiated instruction, please go to http://www.paec.org/teacher2teacher/additional_subjects.html and click on Differentiated Instruction. Work through this online course and review the additional resources.

Foreword

As the world economy continues to evolve, businesses and industries must adopt new practices and processes in order to survive. Quality and cost control, work teams and participatory management, and an infusion of technology are transforming the way people work and do business. Employees are now expected to read, write, and communicate effectively; think creatively, solve problems, and make decisions; and interact with each other and the technologies in the workplace. Vocational-technical programs must also adopt these practices in order to provide graduates who can enter and advance in the changing work world.

The curriculum framework in this document reflects these changes in the workplace and a number of other factors that impact on local vocational-technical programs. Federal and state legislation calls for articulation between high school and community college programs, integration of academic and vocational skills, and the development of sequential courses of study that provide students with the optimum educational path for achieving successful employment. National skills standards, developed by industry groups and sponsored by the U.S. Department of Education and Labor, provide vocational educators with the expectations of employers across the United States. All of these factors are reflected in the framework found in this document.

Referenced throughout the courses of the curriculum are the 21st Century Skills, which were developed by the Partnership for 21st Century Skills, a group of business and education organizations concerned about the gap between the knowledge and skills learned in school and those needed in communities and the workplace. A portion of the 21st Century Skills addresses learning skills needed in the 21st century, including information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills. The need for these types of skills has been recognized for some time and the 21st Century Skills are adapted in part from the 1991 report from the U.S. Secretary of Labor's Commission on Achieving Necessary Skills (SCANS). Another important aspect of learning and working in the 21st century involves technology skills, and the International Society for Technology in Education, developers of the National Educational Technology Standards (NETS), were strategic partners in the Partnership for 21st Century Skills.

Each postsecondary program of instruction consists of a program description and a suggested sequence of courses which focus on the development of occupational competencies. Each vocational-technical course in this sequence has been written using a common format which includes the following components:

- Course Name – A common name that will be used by all community/junior colleges in reporting students.
- Course Abbreviation – A common abbreviation that will be used by all community/junior colleges in reporting students.
- Classification – Courses may be classified as:
 - Vocational-technical core – A required vocational-technical course for all students.

- Area of concentration (AOC) core – A course required in an area of concentration of a cluster of programs.
 - Vocational-technical elective – An elective vocational-technical course.
 - Related academic course – An academic course which provides academic skills and knowledge directly related to the program area.
 - Academic core – An academic course which is required as part of the requirements for an Associate degree.
- Description – A short narrative which includes the major purpose(s) of the course and the recommended number of hours of lecture and laboratory activities to be conducted each week during a regular semester.
 - Prerequisites – A listing of any courses that must be taken prior to or on enrollment in the course.
 - Corequisites – A listing of courses that may be taken while enrolled in the course.
 - Competencies and Suggested Objectives – A listing of the competencies (major concepts and performances) and of the suggested student objectives that will enable students to demonstrate mastery of these competencies.

The following guidelines were used in developing the program(s) in this document and should be considered in compiling and revising course syllabi and daily lesson plans at the local level:

- The content of the courses in this document reflects approximately 75 percent of the time allocated to each course. The remaining 25 percent of each course should be developed at the local district level and may reflect:
 - Additional competencies and objectives within the course related to topics not found in the State framework, including activities related to specific needs of industries in the community college district.
 - Activities which develop a higher level of mastery on the existing competencies and suggested objectives.
 - Activities and instruction related to new technologies and concepts that were not prevalent at the time the current framework was developed/revised.
 - Activities which implement components of the Mississippi Tech Prep initiative, including integration of academic and vocational-technical skills and coursework, school-to-work transition activities, and articulation of secondary and postsecondary vocational-technical programs.
 - Individualized learning activities, including worksite learning activities, to better prepare individuals in the courses for their chosen occupational area.
- Sequencing of the course within a program is left to the discretion of the local district. Naturally, foundation courses related to topics such as safety, tool and equipment usage, and other fundamental skills should be taught first. Other courses related to specific skill areas and related academics, however, may be sequenced to take advantage of seasonal and climatic conditions, resources located outside of the school, and other factors.

- Programs that offer an Associate of Applied Science degree must include a minimum 15 semester credit hour academic core. Specific courses to be taken within this core are to be determined by the local district. Minimum academic core courses are as follows:
 - 3 semester credit hours Math/Science Elective
 - 3 semester credit hours Written Communications Elective
 - 3 semester credit hours Oral Communications Elective
 - 3 semester credit hours Humanities/Fine Arts Elective
 - 3 semester credit hours Social/Behavioral Science Elective

It is recommended that courses in the academic core be spaced out over the entire length of the program, so that students complete some academic and vocational-technical courses each semester. Each community/junior college has the discretion to select the actual courses that are required to meet this academic core requirement.

- In instances where secondary programs are directly related to community and junior college programs, competencies and suggested objectives from the high school programs are listed as Baseline Competencies. These competencies and objectives reflect skills and knowledge that are directly related to the community and junior college vocational-technical program. In adopting the curriculum framework, each community and junior college is asked to give assurances that:
 - Students who can demonstrate mastery of the Baseline Competencies do not receive duplicate instruction, and
 - Students who cannot demonstrate mastery of this content will be given the opportunity to do so.
- The roles of the Baseline Competencies are to:
 - Assist community/junior college personnel in developing articulation agreements with high schools, and
 - Ensure that all community and junior college courses provide a higher level of instruction than their secondary counterparts.
- The Baseline Competencies may be taught as special “Introduction” courses for 3-6 semester hours of institutional credit which will not count toward Associate degree requirements. Community and junior colleges may choose to integrate the Baseline Competencies into ongoing courses in lieu of offering the “Introduction” courses or may offer the competencies through special projects or individualized instruction methods.
- Technical elective courses have been included to allow community colleges and students to customize programs to meet the needs of industries and employers in their area.

In order to provide flexibility within the districts, individual courses within a framework may be customized by:

- Adding new competencies and suggested objectives.
- Revising or extending the suggested objectives for individual competencies.
- Integrating baseline competencies from associated high school programs.

- Adjusting the semester credit hours of a course to be up 1 hour or down 1 hour (after informing the State Board for Community and Junior Colleges [SBCJC] of the change).

In addition, the curriculum framework as a whole may be customized by:

- Resequencing courses within the suggested course sequence.
- Developing and adding a new course which meets specific needs of industries and other clients in the community or junior college district (with SBCJC approval).
- Utilizing the technical elective options in many of the curricula to customize programs.

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Program Description

Postsecondary Forestry Technology is an instructional program that prepares individuals to produce, protect, and manage timber and other forest crops. Students enrolled in the program will participate in a variety of learning experiences related to land and forest measurements, growth processes of timber stands, tree identification, timber and forest product harvesting, timber stand management and protection, and forest products utilization. Emphasis is placed on the development of job skills that allow students to enter employment. The latest technologies and computer application skills are incorporated into courses. The program combines lecture-based activities with laboratory field experiences.

Forestry Technology is a two-year technical program. An Associate of Applied Science degree is awarded upon successful completion of the curriculum.

Industry standards referenced were adapted from *Standards and Procedures for Recognizing Educational Programs in Forest Technology*, as published by the Society of American Foresters (<http://www.safnet.org/education/TechRecStd121604.pdf>).

Suggested Course Sequence*

Forestry Technology

Baseline Competencies for Forestry Technology**

FIRST YEAR

3 sch Botany (BIO 1313)/Natural Science Elective	4 sch Technical Elective
4 sch Forest Measurements I (FOT 1114)	4 sch Technical Elective
3 sch Fundamentals of Microcomputer Applications (CPT 1113)	4 sch Applied Soils – Conservation and Use (AGT 1714)
3 sch Introduction to Forestry (FOT 1813)	3 sch Approved Elective
3 sch Math/Science Elective	3 sch Written Communications Elective
16 sch	18 sch

SECOND YEAR

4 sch Forest Surveying and Spatial Applications (FOT 2124)	4 sch Timber Harvesting (FOT 2424)
4 sch Silviculture I (FOT 2614)	3 sch Technical Elective
4 sch Applied Dendrology (FOT 1714)	3 sch Technical Elective
3 sch Oral Communications Elective	3 sch Humanities/Fine Arts Elective
15 sch	16 sch

* Students who lack entry level skills in math, English, science, etc. will be provided related studies.

** Baseline competencies are taken from the high school Forestry program. Students who can document mastery of these competencies should not receive duplicate instruction. Students who cannot demonstrate mastery will be required to do so.

TECHNICAL ELECTIVES

4 sch Forest Measurements II (FOT 1124)
4 sch Forest Protection (FOT 1314)
4 sch Forest Products Utilization (FOT 1414)
4 sch Silviculture II (FOT 2624)
1-6 sch Work-Based Learning in Forestry Technology [FOT 292(1-6)]
4 sch Advanced GIS/GPS in Forestry (FOT 2214)
3 sch Principles of Accounting I (ACT 1213)
3 sch Applied Agricultural Economics (AGT 2263)
1-3 sch Special Problem in Forestry Technology [FOT 291(1-3)]

- 1-6 sch Supervised Work Experience in Forestry Technology [FOT 293(1-6)]
- 3 sch Business Law (BAD 2413)
- 3 sch Mapping and Topography Lab (DDT 2423)
- 4 sch Fundamentals of Drafting (DDT 1114)
- 3 sch Business Statistics (BAD 2323 or MAT 2323)
- 3 sch Economics I (Macroeconomics) (ECO 2113)
- 3 sch Economics II (Macroeconomics) (ECO 2123)

Forestry Technology Courses

Course Name: Forest Measurements I

Course Abbreviation: FOT 1114

Classification: Vocational-Technical Core

Description: A course covering fundamentals of forest measurements. Includes instruction in locating land on a map, applying sampling techniques, and processing and summarizing field data. (4 sch: 2 hr. lecture, 4 hr. lab) (Formerly Forest Mensuration I)

Prerequisites: None

Competencies and Suggested Objectives	
1.	Establish the physical location of timber and forest products to be cruised. <ol style="list-style-type: none"> a. Apply U.S. Public Land Survey procedures to locate land on a map. b. Physically locate corners and boundaries of land to be cruised from a map. c. Make a preliminary study of the property to determine sampling technique, topography, cruise intensity, and direction of cruise lines.
2.	Apply sampling techniques to measure standing timber and forest products on a given tract of land. <ol style="list-style-type: none"> a. Describe the different types of sampling techniques used in measuring standing timber including line plot, strip, and prism cruising. b. Select the appropriate sampling technique, intensity, and equipment to measure standing timber on a given tract. c. Measure standing timber on the given tract according to the sampling technique and intensity stated. d. Record data following industry accepted practices.
3.	Process field data to determine volume and weight of forest products on a given plot of land. <ol style="list-style-type: none"> a. Interpret raw data from a cruise. b. Calculate cruise tally volumes and weights for the individual tract by product class and species (hardwood, pine, pulpwood, sawtimber, specialty products, etc.).
4.	Summarize field data and prepare a cruise report. <ol style="list-style-type: none"> a. Prepare a detailed cruise report including legal description, timber volumes and values by species and class, average volume per acre, and average volume per tree.

STANDARDS

Proposed Standards for Postsecondary Forestry Technology Programs

The following standards were adopted from *Standards and Procedures for Recognizing Educational Programs in Forest Technology*, as published on the Society of American Foresters

Web site. For more information on certification of postsecondary Forestry Technology programs, see the Society's Web site at <http://www.safnet.org/education/TechRecStd121604.pdf>.

Standard	Description
Dendrology	Field identification of regionally important species by leaves, twigs, bark, and fruit characteristics; knowledge of family, genus, and species of each specimen; knowledge of species association and succession; knowledge of the major commercial trees in North America and their uses; understanding of the use of dichotomous keys.
Measurement	Forest measuring equipment; log scaling practices; forest product measurement; sampling statistics; cruising and inventory techniques; log rules and volume tables; log and tree grading; growth measurement; computer applications and usage.
Land Surveying	Hand compass; surveying equipment and procedures; pacing and chaining; map reading; deed and title search; land descriptions; computer mapping; global positioning systems (GPS); geographic information systems.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause/effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject/verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)

- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
- S3 Structural Unit (root, suffix)

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21st Century Skills

- CS2 Financial, Economic, and Business Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

SUGGESTED REFERENCES

Books

- Avery, H. E., & Burkhart, H. (1994). *Forest measurements* (5th ed.). New York: McGraw Hill.
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USGS. (2006). *Seamless data distribution system*. Retrieved October 9, 2006, from <http://seamless.usgs.gov>

Course Name: Forest Measurements II

Course Abbreviation: FOT 1124

Classification: Vocational-Technical Elective

Description: A continuation of Forest Measurement I with emphasis on electronic and computer applications in forest measurement. (4 sch: 2 hr. lecture, 4 hr. lab) (Formerly Forest Mensuration II)

Prerequisites: Forest Measurements I (FOT 1114)

Competencies and Suggested Objectives

1. Perform forest measurements using computerized equipment.
 - a. Determine acreage of a parcel of land using a global positioning instrument.
 - b. Determine sampling intensity needed from GPS data.
 - c. Compute tract volume using a data recorder.
 - d. Download and process tract volume.
 - e. Digitize a tract map from field information.
 - f. Generate a computerized report of findings.
 - g. Obtain timber price reports.

STANDARDS

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Standard	Description
Dendrology	Field identification of regionally important species by leaves, twigs, bark, and fruit characteristics; knowledge of family, genus, and species of each specimen; knowledge of species association and succession; knowledge of the major commercial trees in North America and their uses; understanding of the use of dichotomous keys.
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Books

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- USGS. (2006). *Seamless data distribution system*. Retrieved October 9, 2006, from <http://seamless.usgs.gov>

Course Name: Forest Protection

Course Abbreviation: FOT 1314

Classification: Vocational-Technical Elective

Description: A course in methods and techniques for protecting forests from fire, insect, and disease damage. Includes instruction in prescribed burning procedures. (4 sch: 2 hr. lecture, 4 hr. lab)

Prerequisites: None

Competencies and Suggested Objectives	
1. Apply prescribed burning methods.	<ul style="list-style-type: none"> a. Identify and describe weather factors that affect prescribed burning, including NOAA and other forecasting tools. b. Describe factors that influence timing of a prescribed burn. c. Describe regulations and liability associated with prescribed burning. d. Compare the different types of prescribed burn methods including backfire, head fire, flank fire, spot fire, and aerial ignition. e. Develop a prescribed burn plan that includes notification of appropriate agencies, personnel, and adjacent land owners; a safety evacuation plan; application for burn permit; location of fire breaks; specific burn techniques to be employed; and fire control procedures and equipment to be used. f. Conduct a prescribed burn and evaluate the results.
2. Apply fire suppression techniques.	<ul style="list-style-type: none"> a. Describe direct and indirect fire suppression techniques including plow lanes and backfires, and direct attack. b. Prepare a report on a specific fire in the local area and analyze the procedures used in suppression.
3. Apply insect control techniques.	<ul style="list-style-type: none"> a. Identify common insect pests associated with trees including physical recognition, life cycle, and probable reasons for attack. b. Describe control methods and strategies for implementation.
4. Apply disease control methods.	<ul style="list-style-type: none"> a. Identify common diseases associated with trees including recognition/diagnosis of the disease, and life cycle. b. Describe control methods and strategies for implementation.

STANDARDS

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Standard	Description
Dendrology	Field identification of regionally important species by leaves, twigs, bark, and fruit characteristics; knowledge of family, genus, and species of each specimen; knowledge of species association and succession; knowledge of the major commercial trees in North America and their uses; understanding of the use of dichotomous keys.
Forest Ecology	Plant succession; site; soils; silvics; environmental protection; weather and climate influences; relations of trees to other organisms; biodiversity; ecosystems.
Silviculture	Methods of regeneration; site preparation; planting practices; intermediate treatments; nursery practice; seed orchards; pesticide use and application; prescribed burning; pre-commercial thinning; commercial thinning; and harvest cutting.
Protection	Fire management; regional problems and control of insects, diseases, and animal damage; threats to forest health.
Woods Safety	Basic first aid; identification of hazards; hand and power tool safety, pesticide/herbicide safety.
Multiple Use of Forest Lands	Wildlife; fish habitat; recreation; wilderness; watershed; timber; range; minerals; public conflicts and public participation.
Forest Management Practices	Timber appraisal; contracts; forest management principles; principles of ecosystem (landscape) based management; regional forest management regulations; sustainable forest management concepts/certification; record keeping and basic accounting.
Principles of Human Resource Management	Human behavior; groups, individuals; motivation; leadership; team building and dynamics; planning; decision-making; rating and evaluation; controlling the workforce; conflict resolution; and ethics.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause/effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations

- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject/verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
- S3 Structural Unit (root, suffix)

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21st Century Skills

- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

SUGGESTED REFERENCES

Books

- U.S. Department of Agriculture. (1972). *Insects and disease of trees in the South*. Washington, DC: Author.
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- U.S. Department of Commerce. (2006, October). *National Oceanic and Atmospheric Administration*. Retrieved October 17, 2006, from Web site: www.noaa.gov

Course Name: Forest Products Utilization

Course Abbreviation: FOT 1414

Classification: Vocational-Technical Elective

Description: A survey of wood and forest products processing operations. Includes instruction in principles related to forest products processing and their applications. (4 sch: 2 hr. lecture, 4 hr. lab)

Prerequisites: None

Competencies and Suggested Objectives	
1.	Describe principles that apply to processing of forest products. <ol style="list-style-type: none"> Identify primary and secondary forest product industries. Describe the microscopic characteristics of wood. Evaluate the wood-water relationship. Identify marketing information and factors that determine log and lumber cost.
2.	Apply principles of forest products processing. <ol style="list-style-type: none"> Grade trees, logs, and lumber. Compare different methods for treating forest products. Compare the different processes for kiln drying forest products.

STANDARDS

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Standard	Description
Dendrology	Field identification of regionally important species by leaves, twigs, bark, and fruit characteristics; knowledge of family, genus, and species of each specimen; knowledge of species association and succession; knowledge of the major commercial trees in North America and their uses; understanding of the use of dichotomous keys.
Measurement	Forest measuring equipment; log scaling practices; forest product measurement; sampling statistics; cruising and inventory techniques; log rules and volume tables; log and tree grading; growth measurement; computer applications and usage.
Woods Safety	Basic first aid; identification of hazards; hand and power tool safety, pesticide/herbicide safety.

Standard	Description
Harvesting Techniques	Harvesting systems; cost analysis; logging plans; wood identification; wood products; road layout and construction; best management practices (BMP's).
Forest Management Practices	Timber appraisal; contracts; forest management principles; principles of ecosystem (landscape) based management; regional forest management regulations; sustainable forest management concepts/certification; record keeping and basic accounting.
Principles of Human Resource Management	Human behavior; groups, individuals; motivation; leadership; team building and dynamics; planning; decision-making; rating and evaluation; controlling the workforce; conflict resolution; and ethics.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause/effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject/verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
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21st Century Skills

- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

SUGGESTED REFERENCES

Books

Haygreen, J. G., & Bowyer, J. L. (2003). *Forest products and wood science* (4th ed.). Ames, IA: Iowa State University Press.

National Hardwood Lumber Association. (2003). *Rules for the measurement and inspection of hardwood and cypress lumber*. Memphis, TN: Author.

Web Sites

The department of wood science and forest products. Retrieved October 17, 2006, from <http://www.woodscience.vt.edu/>

National hardwood lumber association. Retrieved November 17, 2006, from <http://www.natlhardwood.org>

Course Name: Applied Dendrology

Course Abbreviation: FOT 1714

Classification: Vocational-Technical Core

Description: A study of trees including their classification and commercial uses. (4 sch: 2 hr. lecture, 4 hr. lab)

Prerequisites: None

Competencies and Suggested Objectives
1. Apply the binomial classification system. <ol style="list-style-type: none"> a. Classify forest plant species according to the binomial classification system.
2. Apply site-species relationships. <ol style="list-style-type: none"> a. Compare the distribution of trees in Mississippi by regions in the state.
3. Identify commercially important tree species. <ol style="list-style-type: none"> a. Identify important tree species in the area, utilizing leaves, buds, bark, and site observations and their uses (economic, esthetic, recreational, etc.). b. Compare the relative economic importance of tree species by price for all wood products produced.

STANDARDS

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Standard	Description
Dendrology	Field identification of regionally important species by leaves, twigs, bark, and fruit characteristics; knowledge of family, genus, and species of each specimen; knowledge of species association and succession; knowledge of the major commercial trees in North America and their uses; understanding of the use of dichotomous keys.
Forest Ecology	Plant succession; site; soils; silvics; environmental protection; weather and climate influences; relations of trees to other organisms; biodiversity; ecosystems.
Silviculture	Methods of regeneration; site preparation; planting practices; intermediate treatments; nursery practice; seed orchards; pesticide use and application; prescribed burning; pre-commercial thinning; commercial thinning; and harvest cutting.

Standard	Description
Measurement	Forest measuring equipment; log scaling practices; forest product measurement; sampling statistics; cruising and inventory techniques; log rules and volume tables; log and tree grading; growth measurement; computer applications and usage.
Multiple Use of Forest Lands	Wildlife; fish habitat; recreation; wilderness; watershed; timber; range; minerals; public conflicts and public participation.
Forest Management Practices	Timber appraisal; contracts; forest management principles; principles of ecosystem (landscape) based management; regional forest management regulations; sustainable forest management concepts/certification; record keeping and basic accounting.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause/effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- L1 Usage (pronoun, tense, subject/verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
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21st Century Skills

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Coombes, A. J. (2000). *Trees*. New York: Dorling Kindersley.

- Harrar, E. S., & Harrar, J. G. (1964). *Guide to Southern trees* (2nd ed.). New York: Dover.
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- Virginia Tech. (2006). *Id it*. Retrieved October 12, 2006, from <http://www.cnr.vt.edu/dendro/dendrology/main.htm>

Course Name: Introduction to Forestry

Course Abbreviation: FOT 1813

Classification: Vocational-Technical Elective

Description: A study of the development of the forest industry in Mississippi and the United States. An exploration of occupational careers in forestry including forest products industries. Includes common terms used in forest occupations. (Previously taught as Survey of Forestry) (3 sch: 3 hr. lecture)

Prerequisites: None

Competencies and Suggested Objectives	
1.	Trace the development of forestry in Mississippi and in the United States. <ol style="list-style-type: none"> Identify major events and people which have influenced the development of forest policy and legislation in Mississippi and in the United States. Identify and describe practices and techniques in forestry.
2.	Explore educational and career opportunities in forestry and the forest products industries. <ol style="list-style-type: none"> Identify career opportunities in public and private sectors. Identify opportunities for continuing education in forestry. Investigate requirements for different job opportunities including education, working conditions, salaries/wages, advancement, etc.
3.	Apply common terminology used in forest occupations. <ol style="list-style-type: none"> Define and apply standard forestry terms.

STANDARDS

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Standard	Description
Dendrology	Field identification of regionally important species by leaves, twigs, bark, and fruit characteristics; knowledge of family, genus, and species of each specimen; knowledge of species association and succession; knowledge of the major commercial trees in North America and their uses; understanding of the use of dichotomous keys.
Forest Ecology	Plant succession; site; soils; silvics; environmental protection; weather and climate influences; relations of trees to other organisms; biodiversity; ecosystems.

Standard	Description
Silviculture	Methods of regeneration; site preparation; planting practices; intermediate treatments; nursery practice; seed orchards; pesticide use and application; prescribed burning; pre-commercial thinning; commercial thinning; and harvest cutting.
Protection	Fire management; regional problems and control of insects, diseases, and animal damage; threats to forest health.
Measurement	Forest measuring equipment; log scaling practices; forest product measurement; sampling statistics; cruising and inventory techniques; log rules and volume tables; log and tree grading; growth measurement; computer applications and usage.
Land Surveying	Hand compass; surveying equipment and procedures; pacing and chaining; map reading; deed and title search; land descriptions; computer mapping; global positioning systems (GPS); geographic information systems.
Aerial Photo Interpretation	Set up stereo for viewing; scale; height measurement; type mapping; road location; bearings and distances; area determination; identification and interpretation.
Woods Safety	Basic first aid; identification of hazards; hand and power tool safety, pesticide/herbicide safety.
Harvesting Techniques	Harvesting systems; cost analysis; logging plans; wood identification; wood products; road layout and construction; best management practices (BMP's).
Multiple Use of Forest Lands	Wildlife; fish habitat; recreation; wilderness; watershed; timber; range; minerals; public conflicts and public participation.
Forest Management Practices	Timber appraisal; contracts; forest management principles; principles of ecosystem (landscape) based management; regional forest management regulations; sustainable forest management concepts/certification; record keeping and basic accounting.
Principles of Human Resource Management	Human behavior; groups, individuals; motivation; leadership; team building and dynamics; planning; decision-making; rating and evaluation; controlling the workforce; conflict resolution; and ethics.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause/effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)

- A5 Measurement (money, time, temperature, length, area, volume)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject/verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
- S3 Structural Unit (root, suffix)

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21st Century Skills

- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS6 Interpersonal and Self-Directional Skills

SUGGESTED REFERENCES

Books

Sharpe, G. W., Hendee, J. C., & Sharp, W. F. (2003). *Introduction to forests and renewable resources* (7th ed.). Boston: McGraw-Hill.

Journals and Magazines

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Mississippi Forestry Association. (n.d.). Retrieved November 17, 2006, from
<http://msforestry.net/>

SAF Career Center. (n.d.). Retrieved November 17, 2006, from
<http://www.safnet.org/careercenter/index.cfm>.

National Urban and Community Forestry Council. (n.d.). Retrieved November 17, 2006, from
<http://www.treelink.org/nucfac/>

Course Name: Forest Surveying and Spatial Applications

Course Abbreviation: FOT 2124

Classification: Vocational-Technical Core

Description: A course to provide land surveying skills required in the forest industry. Includes instruction in interpreting legal descriptions, deeds, maps, and spatial imagery. Includes demonstration of surveying practices and spatial imagery practices and equipment. (4 sch: 2 hr. lecture, 4 hr. lab) (Formerly Forest Surveying)

Prerequisites: None

Competencies and Suggested Objectives	
1.	Interpret the legal description of land. <ol style="list-style-type: none"> a. Use the U. S. Public Land survey system to locate and describe a given parcel of land on a map. b. Use the U. S. Public Land survey system to write a legal description for a given parcel of land.
2.	Locate and interpret land deeds. <ol style="list-style-type: none"> a. Search indices to locate land records. b. Trace the chain of title for a given parcel of land over a given period of time (title search). c. Interpret land deeds to determine location, ownership, type of conveyance, distances, and directions of boundaries and corners, etc.
3.	Interpret maps and spatial imagery. <ol style="list-style-type: none"> a. Interpret topographic maps to determine boundaries and corners, acreage, legal description of land, elevations, landmarks, etc. for a given parcel of land. b. Interpret spatial imagery to determine boundaries and corners, acreage, legal description of land, elevations, landmarks, etc. for a given parcel of land.
4.	Demonstrate the use of surveying equipment and instruments in forestry technology occupations. <ol style="list-style-type: none"> a. Demonstrate use and proper care of surveying instruments and equipment including compasses, transits, global positioning system (GPS) receivers, and distance measuring equipment.
5.	Demonstrate surveying practices used in forestry technology occupations. <ol style="list-style-type: none"> a. Locate and mark corners and boundary lines for a given parcel of land. b. Demonstrate the use of GPS and distance measuring equipment.

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Web site. For more information on certification of postsecondary Forestry Technology programs, see the Society's Web site at <http://www.safnet.org/education/TechRecStd121604.pdf>.

Standard	Description
Measurement	Forest measuring equipment; log scaling practices; forest product measurement; sampling statistics; cruising and inventory techniques; log rules and volume tables; log and tree grading; growth measurement; computer applications and usage.
Land Surveying	Hand compass; surveying equipment and procedures; pacing and chaining; map reading; deed and title search; land descriptions; computer mapping; global positioning systems (GPS); geographic information systems.
Aerial Photo Interpretation	Set up stereo for viewing; scale; height measurement; type mapping; road location; bearings and distances; area determination; identification and interpretation.
Woods Safety	Basic first aid; identification of hazards; hand and power tool safety, pesticide/herbicide safety.
Principles of Human Resource Management	Human behavior; groups, individuals; motivation; leadership; team building and dynamics; planning; decision-making; rating and evaluation; controlling the workforce; conflict resolution; and ethics.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause/effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject/verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)

- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
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21st Century Skills

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SUGGESTED REFERENCES

Books

Ormsby, T., Napoleon, E., Breslin, P., & Frunzi, N. (1998). *Getting to know ArcView GIS 3.x*. Redlands, CA: ESRI Press.

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ESRI. (2006). *Arcinfo* (Version 9) [Computer software]. Redlands, CA: Author.

Maptech. (2004). *Terrain Navigator* [Computer software]. Amesbury, MA: Author.

Microsoft Office [Computer software]. (2003). Redmond, WA: Microsoft.

New Horizons. (n.d.). *Introduction to Topographic Maps* (Version 1.2) [Computer software]. Armidale, Australia: Author.

Web Sites

GIS for Forestry. (n.d.). Retrieved November 17, 2006, from
<http://esri.com/industries/forestry/index.html>

Course Name: Advanced GPS/GIS in Forestry

Course Abbreviation: FOT 2214

Classification: Vocational-Technical Elective

Description: A course that includes use of remote sensing imagery and geographic information systems software in forest operations. (4 sch: 2 hr. lecture, 4 hr. lab) (Formerly Applications of GIS/GPS in Forestry)

Prerequisites: None

Competencies and Suggested Objectives	
1.	Explain principles of remote sensing interpretation and application of aerial photos and other remote sensing images. <ol style="list-style-type: none"> a. Select project areas for evaluation. b. Find resources for project area image data. c. Inspect and process image data of project areas for target information. d. Explore other resources and methods of remote sensing.
2.	Examine the use of the global positioning system and geographic information systems software. <ol style="list-style-type: none"> a. Demonstrate the use of the global positioning system to find latitude, longitude, and elevation. b. Demonstrate the use of the global positioning system to find state plane coordinates. c. Obtain base station location for differential correction. d. Record location coordinates for routing and navigation. e. Process data into X and Y coordinates. f. Generate tract maps and determine acreage using GIS.

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Standard	Description
Dendrology	Field identification of regionally important species by leaves, twigs, bark, and fruit characteristics; knowledge of family, genus, and species of each specimen; knowledge of species association and succession; knowledge of the major commercial trees in North America and their uses; understanding of the use of dichotomous keys.

Standard	Description
Forest Ecology	Plant succession; site; soils; silvics; environmental protection; weather and climate influences; relations of trees to other organisms; biodiversity; ecosystems.
Silviculture	Methods of regeneration; site preparation; planting practices; intermediate treatments; nursery practice; seed orchards; pesticide use and application; prescribed burning; pre-commercial thinning; commercial thinning; and harvest cutting.
Protection	Fire management; regional problems and control of insects, diseases, and animal damage; threats to forest health.
Measurement	Forest measuring equipment; log scaling practices; forest product measurement; sampling statistics; cruising and inventory techniques; log rules and volume tables; log and tree grading; growth measurement; computer applications and usage.
Land Surveying	Hand compass; surveying equipment and procedures; pacing and chaining; map reading; deed and title search; land descriptions; computer mapping; global positioning systems (GPS); geographic information systems.
Aerial Photo Interpretation	Set up stereo for viewing; scale; height measurement; type mapping; road location; bearings and distances; area determination; identification and interpretation.
Woods Safety	Basic first aid; identification of hazards; hand and power tool safety, pesticide/herbicide safety.
Harvesting Techniques	Harvesting systems; cost analysis; logging plans; wood identification; wood products; road layout and construction; best management practices (BMP's).
Multiple Use of Forest Lands	Wildlife; fish habitat; recreation; wilderness; watershed; timber; range; minerals; public conflicts and public participation.
Forest Management Practices	Timber appraisal; contracts; forest management principles; principles of ecosystem (landscape) based management; regional forest management regulations; sustainable forest management concepts/certification; record keeping and basic accounting.
Principles of Human Resource Management	Human behavior; groups, individuals; motivation; leadership; team building and dynamics; planning; decision-making; rating and evaluation; controlling the workforce; conflict resolution; and ethics.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
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- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)

- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject/verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
- S3 Structural Unit (root, suffix)

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21st Century Skills

- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

SUGGESTED REFERENCES

Books

Ormsby, T., Napoleon, E., Breslin, P., & Frunzi, N. (1998). *Getting to know ArcView GIS 3.x*. Redlands, CA: ESRI Press.

Computer Software

ESRI. (2006). *Arcinfo* (Version 9) [Computer software]. Redlands, CA: Author.

Maptech. (2004). *Terrain Navigator* [Computer software]. Amesbury, MA: Author.

Microsoft Office [Computer software]. (2003). Redmond, WA: Microsoft.

New Horizons. (n.d.). Introduction to Topographic Maps (Version 1.2) [Computer software].
Armidale, New South Wales, Australia: Author.

Course Name: Timber Harvesting

Course Abbreviation: FOT 2424

Classification: Vocational-Technical Core

Description: A course dealing with harvesting practices including development of timber harvesting, regulations, harvesting plans, best management practices, and timber contracts. Includes observations of logging operations. (4 sch: 1 hr. lecture, 6 hr. lab)

Prerequisites: None

Competencies and Suggested Objectives	
1.	Describe timber harvesting equipment and practices used in the southeastern United States. <ol style="list-style-type: none"> Describe how timber harvesting practices have evolved over time in response to economic, environmental, and regulatory factors. Discuss the use of harvesting equipment including operating costs, advantages, limitations, etc. Observe equipment in logging operations and prepare a report based on the observations.
2.	Identify regulations associated with timber harvesting operations. <ol style="list-style-type: none"> Describe safety regulations for timber harvesting operations. Describe environmental regulations for timber harvesting operations.
3.	Prepare a timber harvesting plan for a given parcel of timber. <ol style="list-style-type: none"> Identify and describe Best Management Practices (BMP's) for timber harvesting, including minimizing visual and environmental impact. Prepare a logging plan for a given tract of timber to include placement of decks, skid trails and roads, equipment to be used, access to public roads, and BMP's to be used.
4.	Interpret a timber sale contract. <ol style="list-style-type: none"> Identify essential elements of a timber sale contract including owner, location, timber removal period, type of payment, and special considerations.

STANDARDS

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Standard	Description
Dendrology	Field identification of regionally important species by leaves, twigs, bark, and fruit characteristics; knowledge of family, genus, and species of each specimen; knowledge of species association and succession; knowledge of the major commercial trees in North America and their uses; understanding of the use of dichotomous keys.
Forest Ecology	Plant succession; site; soils; silvics; environmental protection; weather and climate influences; relations of trees to other organisms; biodiversity; ecosystems.
Silviculture	Methods of regeneration; site preparation; planting practices; intermediate treatments; nursery practice; seed orchards; pesticide use and application; prescribed burning; pre-commercial thinning; commercial thinning; and harvest cutting.
Protection	Fire management; regional problems and control of insects, diseases, and animal damage; threats to forest health.
Measurement	Forest measuring equipment; log scaling practices; forest product measurement; sampling statistics; cruising and inventory techniques; log rules and volume tables; log and tree grading; growth measurement; computer applications and usage.
Land Surveying	Hand compass; surveying equipment and procedures; pacing and chaining; map reading; deed and title search; land descriptions; computer mapping; global positioning systems (GPS); geographic information systems.
Aerial Photo Interpretation	Set up stereo for viewing; scale; height measurement; type mapping; road location; bearings and distances; area determination; identification and interpretation.
Woods Safety	Basic first aid; identification of hazards; hand and power tool safety, pesticide/herbicide safety.
Harvesting Techniques	Harvesting systems; cost analysis; logging plans; wood identification; wood products; road layout and construction; best management practices (BMP's).
Multiple Use of Forest Lands	Wildlife; fish habitat; recreation; wilderness; watershed; timber; range; minerals; public conflicts and public participation.
Forest Management Practices	Timber appraisal; contracts; forest management principles; principles of ecosystem (landscape) based management; regional forest management regulations; sustainable forest management concepts/certification; record keeping and basic accounting.
Principles of Human Resource Management	Human behavior; groups, individuals; motivation; leadership; team building and dynamics; planning; decision-making; rating and evaluation; controlling the workforce; conflict resolution; and ethics.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause/effect)

- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject/verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
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21st Century Skills

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SUGGESTED REFERENCES

Books

Conway, S. (1982). *Logging practices* (Rev. ed.). New York: W.H Freeman and Company.

Mississippi Forestry Commission. (2000). *Best management practices for forestry in Mississippi* (3rd ed.). Jackson, MS: Author.

Stenzel, G., Walbridge, T. A., & Pearce, J. K. (1985). *Logging and pulpwood production* (2nd ed.). New York: Wiley.

Journals and Magazines

Hatten-Brown Publications. (n.d.). *Southern loggin' times magazine*. Montgomery, AL: Author.

Hatten-Brown Publications. (n.d.). *Timber harvesting magazine*. Montgomery, AL: Author.

Course Name: Silviculture I

Course Abbreviation: FOT 2614

Classification: Vocational-Technical Core

Description: A course dealing with the growth and development of trees and stands. Includes instruction in principles of tree and stand growth and development, regeneration, and intermediate cuttings. (4 sch: 2 hr. lecture, 4 hr. lab)

Prerequisites: None

Competencies and Suggested Objectives	
1.	Apply principles of tree physiology (silvics). <ol style="list-style-type: none"> a. Describe the factors that affect growth of individual trees in the forest. b. Describe factors that affect the growth and development of forest stands.
2.	Apply principles of regeneration and reproductive methods. <ol style="list-style-type: none"> a. Describe procedures for implementing regeneration of timber stands, including natural regeneration and artificial regeneration. b. Prepare a regeneration plan for a given parcel of land.
3.	Select intermediate cutting procedures for various stands of timber. <ol style="list-style-type: none"> a. Describe the different types of intermediate cuttings to include release cuttings, thinnings, pruning, and salvage. b. Select the appropriate intermediate cutting procedure for a given stand of timber. c. Select trees for intermediate cutting.

STANDARDS

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Standard	Description
Dendrology	Field identification of regionally important species by leaves, twigs, bark, and fruit characteristics; knowledge of family, genus, and species of each specimen; knowledge of species association and succession; knowledge of the major commercial trees in North America and their uses; understanding of the use of dichotomous keys.
Forest Ecology	Plant succession; site; soils; silvics; environmental protection; weather and climate influences; relations of trees to other organisms; biodiversity; ecosystems.

Standard	Description
Silviculture	Methods of regeneration; site preparation; planting practices; intermediate treatments; nursery practice; seed orchards; pesticide use and application; prescribed burning; pre-commercial thinning; commercial thinning; and harvest cutting.
Protection	Fire management; regional problems and control of insects, diseases, and animal damage; threats to forest health.
Measurement	Forest measuring equipment; log scaling practices; forest product measurement; sampling statistics; cruising and inventory techniques; log rules and volume tables; log and tree grading; growth measurement; computer applications and usage.
Land Surveying	Hand compass; surveying equipment and procedures; pacing and chaining; map reading; deed and title search; land descriptions; computer mapping; global positioning systems (GPS); geographic information systems.
Aerial Photo Interpretation	Set up stereo for viewing; scale; height measurement; type mapping; road location; bearings and distances; area determination; identification and interpretation.
Woods Safety	Basic first aid; identification of hazards; hand and power tool safety, pesticide/herbicide safety.
Harvesting Techniques	Harvesting systems; cost analysis; logging plans; wood identification; wood products; road layout and construction; best management practices (BMP's).
Multiple Use of Forest Lands	Wildlife; fish habitat; recreation; wilderness; watershed; timber; range; minerals; public conflicts and public participation.
Forest Management Practices	Timber appraisal; contracts; forest management principles; principles of ecosystem (landscape) based management; regional forest management regulations; sustainable forest management concepts/certification; record keeping and basic accounting.
Principles of Human Resource Management	Human behavior; groups, individuals; motivation; leadership; team building and dynamics; planning; decision-making; rating and evaluation; controlling the workforce; conflict resolution; and ethics.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause/effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
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- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject/verb agreement, adjective, adverb)
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21st Century Skills

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SUGGESTED REFERENCES

Books

- Baker, J. B., & Broadfoot, W. M. (1984). *Site evaluation for commercially important Southern hardwood* (Tech Rep. SO-26). Washington, DC: USDA.
- Nyland, R. D. (1996). *Silviculture: Concepts and applications*. Boston: McGraw-Hill.
- Smith, D. M., Larson, B. C., Kelty, M. J., & Ashton, M. S. (1996). *The practice of silviculture: Applied forest ecology* (9th ed.). New York: John Wiley & Sons.
- Soil Survey Staff. (1951). *County soil survey manual*. Washington, DC: USDA.

USDA Forest Service. (1996). *A guide to the care and planting of Southern pine seedlings*. Washington, DC: Author.

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Mississippi State University. (n.d.). *MSU cares: Coordinated access to the research and extension system*. Retrieved October 17, 2006, from <http://msucares.com>

Monsanto. (2006). *Monsanto image*. Retrieved October 17, 2006, from <http://www.monsanto.com>

Course Name: Silviculture II

Course Abbreviation: FOT 2624

Classification: Vocational-Technical Elective

Description: A continuation of Silviculture I with emphasis on site preparation and regeneration practices. (4 sch: 2 hr. lecture; 4 hr. lab)

Prerequisites: Silviculture I

Competencies and Suggested Objectives	
1.	Apply site preparation practices used in forestry. <ol style="list-style-type: none"> Describe the different types of site preparation practices used in forestry including prescribed burning, shear and rake, chopping, herbicidal treatments, and planting with herbicide applications. Compare costs and benefits of each different type of site preparation practice. Prepare a site preparation plan for a given tract of land to include procedures, budget, timing, acreage treated, participation in government programs, etc.
2.	Apply regeneration practices used in forestry. <ol style="list-style-type: none"> Describe the advantages and disadvantages of the different types of natural and artificial regeneration practices. Describe the use of genetically improved seedlings in regeneration. Describe the different types of planting practices used in artificial regeneration. Observe and participate in tree planting activities and inspections. Describe the process of genetic tree improvement.

STANDARDS

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Forest Ecology	Plant succession; site; soils; silvics; environmental protection; weather and climate influences; relations of trees to other organisms; biodiversity; ecosystems.

Standard	Description
Silviculture	Methods of regeneration; site preparation; planting practices; intermediate treatments; nursery practice; seed orchards; pesticide use and application; prescribed burning; pre-commercial thinning; commercial thinning; and harvest cutting.
Protection	Fire management; regional problems and control of insects, diseases, and animal damage; threats to forest health.
Measurement	Forest measuring equipment; log scaling practices; forest product measurement; sampling statistics; cruising and inventory techniques; log rules and volume tables; log and tree grading; growth measurement; computer applications and usage.
Land Surveying	Hand compass; surveying equipment and procedures; pacing and chaining; map reading; deed and title search; land descriptions; computer mapping; global positioning systems (GPS); geographic information systems.
Aerial Photo Interpretation	Set up stereo for viewing; scale; height measurement; type mapping; road location; bearings and distances; area determination; identification and interpretation.
Woods Safety	Basic first aid; identification of hazards; hand and power tool safety, pesticide/herbicide safety.
Harvesting Techniques	Harvesting systems; cost analysis; logging plans; wood identification; wood products; road layout and construction; best management practices (BMP's).
Multiple Use of Forest Lands	Wildlife; fish habitat; recreation; wilderness; watershed; timber; range; minerals; public conflicts and public participation.
Forest Management Practices	Timber appraisal; contracts; forest management principles; principles of ecosystem (landscape) based management; regional forest management regulations; sustainable forest management concepts/certification; record keeping and basic accounting.
Principles of Human Resource Management	Human behavior; groups, individuals; motivation; leadership; team building and dynamics; planning; decision-making; rating and evaluation; controlling the workforce; conflict resolution; and ethics.

Related Academic Standards

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- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause/effect)
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- M5 Decimals (addition, subtraction, multiplication, division)
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- M7 Integers (addition, subtraction, multiplication, division)

- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
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- L1 Usage (pronoun, tense, subject/verb agreement, adjective, adverb)
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- Baker, J. B., & Broadfoot, W. M. (1984). *Site evaluation for commercially important Southern hardwood* (Tech Rep. SO-26). Washington, DC: USDA.
- Nyland, R. D. (1996). *Silviculture: Concepts and applications*. Boston: McGraw-Hill.
- Smith, D. M., Larson, B. C., Kelty, M. J., & Ashton, M. S. (1996). *The practice of silviculture: Applied forest ecology* (9th ed.). New York: John Wiley & Sons.
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Monsanto. (2006). *Monsanto image*. Retrieved October 17, 2006, from <http://www.monsanto.com>

Course Name: Special Problem in Forestry Technology

Course Abbreviation: FOT 291(1-3)

Classification: Vocational-Technical Elective

Description: A course designed to provide the student with practical application of skills and knowledge gained in other Forest Technology courses. The instructor works closely with the student to insure that the selection of a project will enhance the student's learning experience. (1-3 sch: 2-6 hr. lab)

Prerequisites: Minimum of 12 sch Forestry Technology related courses or consent of instructor

Competencies and Suggested Objectives
1. Develop a written plan which details the activities and projects to be completed. <ol style="list-style-type: none"> a. Use a written plan which details the activities and projects to be completed. b. Perform written occupational objectives in the special problem.
2. Assess accomplishment of objectives. <ol style="list-style-type: none"> a. Prepare daily written assessments of accomplishment of objectives. b. Present weekly written reports to the instructor of activities performed and objectives accomplished.
3. Use and follow a set of written guidelines for the special problem. <ol style="list-style-type: none"> a. Develop and follow a set of written guidelines for the special problem.

STANDARDS

Specific standards for this course will depend upon the nature of the problem under investigation.

SUGGESTED REFERENCES

Specific references for use in this course will depend upon the nature of the problem under investigation.

Course Name: Supervised Work Experience in Forestry Technology

Course Abbreviation: FOT 292(1-6)

Classification: Vocational-Technical Elective

Description: A course which is a cooperative program involving students, employers, and educational staff and is designed to integrate the student's technical studies with real world situations. Variable credit is awarded on the basis of one semester hour per 45 contact hours. (1-6 sch: 3-18 hr. externship)

Prerequisite: Consent of instructor and completion of at least one semester of advanced coursework in Forestry Technology.

Competencies and Suggested Objectives
1. Follow a set of instructor-written guidelines for the supervised work experience program.
2. Apply skills needed to be a viable member of the workforce. <ol style="list-style-type: none"> a. Prepare a description of skills to be developed in the supervised work experience program. b. Practice skills needed to be a viable member of the workforce.
3. Practice human relationship skills in the supervised work experience program.
4. Practice positive work habits, responsibilities, and ethics.
5. Develop written occupational objectives in the supervised work experience program.
6. Assess performance of occupational skills. <ol style="list-style-type: none"> a. Prepare daily written assessments of work performance as specified in the occupational objectives. b. Present weekly written reports to the instructor of activities performed and objectives accomplished.

STANDARDS

Specific standards for this course will depend upon the nature of the problem under investigation.

SUGGESTED REFERENCES

Specific references for use in this course will depend upon the nature of the problem under investigation.

Course Name: Work-Based Learning I, II, III, IV, V, and VI

Course Abbreviation: WBL 191(1-3), WBL 192(1-3), WBL 193(1-3), WBL 291(1-3), WBL 292(1-3), and WBL 293(1-3)

Classification: Free Elective

Description: A structured work-site learning experience in which the student, program area teacher, Work-Based Learning Coordinator, and worksite supervisor/mentor develop and implement an educational training agreement. Designed to integrate the student's academic and technical skills into a work environment. May include regular meetings and seminars with school personnel and employers for supplemental instruction and progress reviews. (1-3 sch: 3-9 hours externship)

Prerequisite: Concurrent enrollment in vocational-technical program area courses

Competencies and Suggested Objectives

- | |
|---|
| <ol style="list-style-type: none"> 1. Apply technical skills and related academic knowledge needed to be a viable member of the workforce. <ol style="list-style-type: none"> a. Demonstrate technical skills necessary to complete job requirements. b. Demonstrate academic skills necessary to complete job requirements. c. Perform tasks detailed in an educational training agreement at the work setting. 2. Apply general workplace skills to include positive work habits necessary for successful employment. <ol style="list-style-type: none"> a. Demonstrate appropriate human relationship skills in the work setting to include conflict resolution, team participation, leadership, negotiation, and customer/client service. b. Utilize time, materials, and resource management skills. c. Use critical thinking skills such as problem solving, decision making, and reasoning. d. Acquire, evaluate, organize, maintain, interpret, and communicate information. |
|---|

STANDARDS

Specific standards for this course will depend upon the nature of the problem under investigation.

SUGGESTED REFERENCES

Specific references for this course will depend upon the nature of the problem under investigation.

Recommended Tools and Equipment

CAPITALIZED ITEMS

1. GPS unit (1 per 4 students)
2. Hand-held 2-way radio (1 per 4 students)
3. HAGLOF Distance Measuring Device (1 per 4 students)
4. HAGLOF Vertex (1 per 4 students)
5. Field data recorder (1 per program)
6. Microcomputer with CD-ROM (1 per student)
7. Microcomputer laser printer (networked) (1 per network)
8. Digitizing tablet for computer (1 per program)
9. Electronic distance measure unit (1 per 10 students)

NON-CAPITALIZED ITEMS

1. Map light table (2 per program)
2. Diameter tape (1 per 3 students)
3. Clinometer (1 per 3 students)
4. Loggers tape (1 per 3 students)
5. Prism (1 per 3 students)
6. Tally book (1 per 3 students)
7. Compass (1 per 3 students)
8. Cruiser's vest or field bag (1 per 3 students)
9. Surveyor's transit with stadia (1 per 10 students)
10. Staff compass (1 per 10 students)
11. Range pole (1 per 10 students)
12. Gunter's chain (1 per 10 students)
13. Chain pins (1 bundle per 10 students)
14. Tree marking devices (1 per 2 students)
15. Increment borer (1 per 2 students)
16. Bark gauge (1 per 2 students)
17. Hard hats (1 per student)
18. Snake leggings (1 per student)
19. Safety glasses or goggles (1 per student)
20. Ear plugs or muffs (1 per student)
21. First aid kit (1 per 10 students)
22. Drip torch (1 per 10 students)
23. Backpack water pump (1 per 5 students)
24. Fire rake (1 per 5 students)
25. Fire flap (1 per 5 students)
26. Fire axe (1 per 5 students)
27. Round point shovel (1 per 5 students)
28. Wind speed detector (1 per 1 program)
29. Fire weather kit (1 per program)
30. Lumber rules (1 per student)

31. Moisture meter (1 per 5 students)
32. Tree injector (1 per 5 students)
33. Tree planting bar (1 per 5 students)
34. Hoe-dad planter (1 per 5 students)
35. Tree planting bag (1 per 5 students)

RECOMMENDED INSTRUCTIONAL AIDS

It is recommended that instructors have access to the following items:

1. Microcomputer integrated software package (word processing, spreadsheet and data base)
2. Digitizing software package
3. Timber cruising software package
4. GPS mapping system software
5. Wood identification kit
6. Video camera/recorder
7. TV/monitor and VCR/DVD player
8. Cart, AV (for use with TV monitor and VCR/DVD)
9. Digital camera
10. LED projector

ASSESSMENT

BLUEPRINT

This program is assessed using the MS-CPAS. The following blueprint summary contains the competencies that are measured when assessing this program. Competencies are grouped into *clusters* and a weight is given to each cluster to determine the number of items needed from each cluster. The numbers of C1s and C2s (item difficulty levels) are also indicated on the blueprint.

Title of Program: Forestry Technology

Program Level: Postsecondary

Cluster/Competency	Level 1 (C1)	Level 2 (C2)	TOTAL	%
	Number	Number		
Cluster 1 : Forest Mensuration FOT 1114	8	7	15	15%
Cluster 2 : Introduction to Forestry FOT 1813	11	2	13	13%
Cluster 3 : Forest Surveying FOT 2124	12	3	15	15%
Cluster 4 : Silviculture FOT 2614	12	3	15	15%
Cluster 5: Dendrology FOT 1713	11	1	12	12%
Cluster 6: Soils AGT 1714	12	3	15	15%
Cluster 7: Timber Harvesting FOT 2424	12	3	15	15%
Total Questions:	78	22	100	100%

Baseline Competencies

The following competencies and suggested objectives are taken from the publication *Mississippi Curriculum Framework for Forestry*. These competencies and objectives represent the baseline which was used to develop the community/junior college Forestry Technology courses. Students enrolled in postsecondary courses should either (1) have documented mastery of these competencies, or (2) be provided with these competencies before studying the advanced competencies in the Forestry Technology program.

Baseline competencies may be integrated into existing courses in the curriculum or taught as special “Introduction” courses. The “Introduction” courses may be taught for up to six semester hours of institutional credit and may be divided into two courses. If the Baseline Competencies are to be taught as “Introduction” courses, each course should be at least 3 credit hours. The following course number(s) and description should be used:

Course Name(s): Introduction to Forestry Technology, Introduction to Forestry Technology I, or Introduction to Forestry Technology II

Course Abbreviation(s): FOT 100(3-6), FOT 1013, FOT 1023

Classification: Vocational-Technical Core

Description: These courses contain the baseline competencies and suggested objectives from the high school curriculum which directly relate to the community college program. The courses are designed for students entering the community college who have had no previous training or documented experience in the field. (3-6 semester hours based upon existing skills for each student, may be divided into 2 courses for a maximum total of 6 hours of institutional credit.)

Competencies and Suggested Objectives:

1. Explain the importance of forestry.
 - a. Describe the elements of a forest community, including trees, plants, shrubs, soil, water, and animal life.
 - b. Describe the importance of trees and forests, including products, employment, climate, air quality, erosion, and recreation.
 - c. Describe the amount of forested land worldwide and in the United States, including acres of forest land and acres of commercial land within the local county or regional area.
 - d. Describe the history of forestry, including the importance of forestry to the South and to Mississippi.
 - e. Describe the importance of forests in the South, including growing season, timber inventory, and economic impact.
 - f. Describe resources considered in multiple-use forest management, including timber, soil, wildlife, recreation, and water.
2. Explain careers in the field of forestry.
 - a. Identify the careers available in the field of forestry.

- b. Describe educational requirements, job opportunities, duties, and responsibilities for professional, technical, and forestry workers.
3. Explain the impact of federal and state regulations on forestry operations.
 - a. Examine the impact of federal regulations on forest operations.
 - b. Examine the impact of state regulations on forest operations.
4. Explain forest safety practices.
 - a. Describe first aid and first aid equipment used in forestry work.
 - b. Describe job site safety practices, including the hazards, carelessness, safety equipment, safety regulations, and prevention of accidents.
 - c. Explain the impact of federal and state safety regulations (such as OSHA) on forestry operations.
5. Describe forest environmental hazards, including heat, cold, plants, insects, wildlife, and topographical hazards.
 - a. Identify characteristics of forest insects and wildlife.
 - b. Explain signs and symptoms of exposure to insects and wildlife.
6. Demonstrate forest safety practices.
 - a. Apply safety practices to environmental, wildlife, and topographical hazards.
 - b. Apply job site safety practices.
 - c. Discuss types and frequency of forest accidents.
7. Explain tree physiology.
 - a. Describe the main parts of a tree, including trunk, crown, and roots along with their functions.
 - b. Describe tree respiration and photosynthesis, including respiration, transfer of water, minerals, nutrients, and production of food.
 - c. Describe environmental and biological factors that affect tree growth, including temperature, moisture, light, air, soil, tolerance, and hardiness.
 - d. Describe the methods of tree reproduction, including sprouts, seeds, and suckers.
 - e. Identify characteristics of tree growth, including height and diameter growth.
8. Explain forest stand development.
 - a. Identify stands according to classifications, including age, size, and composition.
 - b. Identify trees according to crown classes.
9. Explain applications of tissue culture, cloning, and other advances in biotechnology to forestry.
 - a. Describe applications of tissue culture, cloning, and other advances in biotechnology to forestry.
10. Explain the tree classification system.
 - a. Identify nomenclature and taxonomy terms.
 - b. Identify common name and/or binomial name of trees.
11. Identify trees by characteristics.
 - a. Describe identifying characteristics of trees, including fruit, leaves, twigs, bark, and tree form.
 - b. Collect leaves and/or bark samples of species found locally.
12. Explain concepts of forest surveying.
 - a. Define terms, including bearings, acre, azimuths, chaining, boundary lines, angles, surveying, traversing, latitude, and longitude.

- b. Describe the importance of surveying to forestry, including timber sales, land measurement, boundary marking, and mapping.
 - c. Identify characteristics of a forest survey, including use of compass, measuring distances, and mapping.
 - d. Identify surveying tools, including compass, chain, plumb bob, and range pole.
 - e. Label parts of a compass, including magnetic needle, pivot point, housing graduated degrees, and sighting mirror.
 - f. Identify and calculate compass measurements and symbols, including azimuths, bearings, and degrees.
13. Perform forestry surveying and mapping techniques.
- a. Determine the number of paces per chain using common pacing techniques.
 - b. Perform compass, pacing, and chaining skills, including completing a traverse of a selected area.
 - c. Utilize new technologies for forest surveying and mapping to include GPS and GIS and remote sensing.
14. Calculate acreage of forest tracts.
- a. Determine acres from remote sensing.
 - b. Determine acres from a traverse.
15. Describe the United States Public Land Survey System.
- a. Explain and identify the principal meridians, baselines, and initial points used in Mississippi, including location of these lines on a map.
 - b. Define legal land description terms, including bearing, blaze, contour, elevation, legend, plot, sea level, topographic map and corner markers.
 - c. Explain reasons and importance for land location in forestry, including retrace, location, and layout of boundaries.
16. Identify information found on maps.
- a. Interpret information from and demonstrate use of ownership maps.
 - b. Interpret information from and demonstrate use of topographic maps.
17. Apply principles of legal land description.
- a. Write, read, and locate parcels of land using legal land descriptions.
 - b. Observe the records of timber and land deeds.
18. Explain tree measurement techniques.
- a. Define terms, including board feet, basal area, cord, diameter at breast height (DBH), diameter, diameter inside bark (DIB), diameter outside bark (DOB), form class, one thousand board feet (MBF), merchantable height, sawlog, sawtimber, and sticks.
 - b. Identify tools used in taking tree measurements and associate them with uses, including D-tape, tree stick, tree calipers, wedge prism, clinometer, and increment borer.
 - c. Classify DBH measurements into the correct diameter classes, including one- and two-inch classes.
 - d. Demonstrate the correct location of DBH measurements, including trees on level ground, slopes, leaning, forking, and deformed.
 - e. Identify merchantable height, including heights for sawtimber, pulpwood, and specialty products.
 - f. Distinguish among the major log rules, including Doyle, Scribner, and International log rules.
 - g. Draw tally symbols, including dot-tally method.

19. Perform volume measurement of standing timber and sawlogs.
 - a. Determine the volume of standing timber, including volume computation from DBH and height measurements and basal area.
 - b. Calculate the net volume of logs, including measuring length and DIB at small end of log to obtain volume and weight scaling of logs for volume.
 - c. Calculate the volume of standing timber using traditional methods and computer software.
20. Describe procedures for cruising timber.
 - a. Discuss terms associated with cruising, including basal area, board foot, bole, circumference, cord, cull, cunit, diameter at breast height (DBH), dendrometer, diameter, DIB, DOB, form class, hypsometer, MBF, merchantable height, sawlog, sawtimber, sticks, taper, and whorl.
 - b. Describe reasons for conducting a cruise, including management and procurement.
 - c. Describe factors that determine cruise intensity, including acreage, species, timber density, value, and purpose of cruise.
21. Perform timber cruising.
 - a. Describe cruising techniques.
 - b. Perform a cruise and volume calculation using traditional methods and computer software.
22. Apply procedures to identify forest types.
 - a. Define terms associated with forest types.
 - b. Distinguish between softwoods and hardwoods, including all characteristics of hardwoods and softwoods.
 - c. Identify forest regions of the United States on a map, including Pacific Coast, Rocky Mountains, Northern, Central Hardwood, Southern, and Tropical.
 - d. Identify the principal species associated with the forest regions of Mississippi, including oak-pine, oak-gum-cypress, oak-hickory, loblolly-shortleaf, and longleaf-slash.
23. Apply procedures to identify the physical properties of wood.
 - a. Identify the physical properties of wood according to wood uses, including specific gravity, grain, strength, stiffness, bending, hardness, toughness, ability to be stained, and chemical properties.
 - b. Describe Mississippi wood products according to their importance to the state and local economy, including sawlogs, pulpwood products, poles and posts, veneer, furniture products, miscellaneous, and by-products.
 - c. Describe the role of recycling in the forest products industry, including impact on forest management and harvesting practices.
24. Develop employability skills.
 - a. Discuss employability traits.
 - b. Prepare a computerized resume containing essential information including personal information, education, and employment experience using correct grammar, spelling, and punctuation.
 - c. Complete job application forms including correct grammar, spelling, and punctuation.
 - d. Explain procedures for job interviews using correct job etiquette.
 - e. Demonstrate the role of an applicant in a job interview using correct interview procedures.
 - f. Explore job opportunities using a computerized database.

25. Explain forest management practices.
 - a. Define terms associated with forest management practices, including BMPs and SMZs, age classifications, forest management, improvement cutting, selection cutting, timber stand improvement, stand types, and wildlife management.
 - b. Identify the role of forest management, including forest crops, management of stands, measurement of stands, goals and objectives of the landowner, and voluntary best management practices.
 - c. Describe forest management practices, including silviculture, reproduction, harvest cuttings, fertilization, and herbicide application.
 - d. Discuss BMPs and SMZs.
26. Apply forest management practices.
 - a. Describe the purposes of intermediate cutting in forest management, including maximizing growth, control spacing, and removal of undesirable trees.
 - b. Determine the type of intermediate cut, including pre-commercial, pulpwood, release, and salvage.
 - c. Classify timber stand improvement needs, including thin overstocked stands, prescribed burning, fertilization, herbicide use, and salvage cuts.
27. Plan and conduct a timber cruise.
 - a. Prepare cruise layouts, including drawing of a diagram describing a 10% sample systematic grid.
 - b. Conduct timber cruises and determine tract volume and values, including 10%, 20%, and 100% samples.
 - c. Discuss point sampling.
28. Explain timber marketing procedures.
 - a. Define terms associated with timber marketing, including compliance, management prescriptions, offeree, and offeror.
 - b. Describe marketing practices for selling at the highest return, including marking, estimating timber, determining the value of timber, and selling the timber for the highest price.
 - c. Identify potential markets, including pulp-paper mills, post mill, sawmill, specialty markets, export markets, firewood sales, and distance to these markets.
 - d. Describe how to determine the highest value of a timber stand, including preparing a prospectus and a timber sale contract.
29. Describe conditions of sale and harvesting of timber.
 - a. Describe legal documents used in the sale and harvesting of timber, including the prospectus, timber sale contract, timber deed, and harvesting contract.
 - b. Describe desirable post-harvest land conditions which may be specified in a harvesting contract.
 - c. Describe logistics of transporting timber to markets, including the effect upon the price received by the producer.
30. Explain timber harvesting procedures.
 - a. Define terms associated with timber harvesting, including harvesting layout, BMPs and SMZs, felling, topping, bunching, skidding, merchandising, loading, and hauling.
 - b. Describe the methods of harvesting timber, including selection, seed-tree, shelterwood, clear-cut, and mechanical.

- c. Identify the products of harvesting, including pulpwood, sawlogs, and specialty wood products.
31. Develop a timber harvesting plan.
- a. Identify types of harvesting equipment, including saws, fellerbunchers, pre-haulers, skidders, whole tree chippers, loaders, and hauling vehicles.
 - b. Observe timber harvesting operations, including forest management practices of pulpwood and sawlogs.
 - c. Describe desirable post-harvesting land conditions, including disposition of non-merchantable timber, dead trees, tree tops, soil cover, and damage caused by logging equipment.
 - d. Develop a simple harvesting plan for a given tract of timber.
32. Explain reforestation practices.
- a. Define reforestation terms, including planting tools, methods of seeding, and site preparation.
 - b. Identify the sources of tree seedlings, including private, state, and federal nurseries.
 - c. Describe the methods of handling seedlings, including plant as soon as possible, heel in, and keep in cold storage.
 - d. Describe the methods of planting, including direct seeding, hand planting, and machine planting.
 - e. Describe the different types of site preparation, including roll chop, shearing, burning, chemical, piling, and bedding.
 - f. Describe the types of reforestation, including artificial and natural means.
 - g. Describe the economics of reforestation.
 - h. Identify federal and state reforestation programs available locally.
33. Perform reforestation practices.
- a. Plant seedlings, including using all available methods.
 - b. Perform a compliance check, including carrying out a standard Mississippi Forestry Commission compliance check.
34. Explain forest fire management practices.
- a. Define the terms associated with forest fires, including types of fires, behavior, fuels, controls, and weather conditions.
 - b. Identify the elements of the fire triangle, including heat, fuel, and oxygen.
 - c. Identify the classes of fires, including ground, surface, and crown.
 - d. Identify the methods of attack, including direct and indirect.
 - e. Identify firefighting tools according to their uses, including rakes, swatters, cutting tools, back pack sprayer, drip torch, and fire plows.
35. Apply forest fire management techniques.
- a. Develop a prescribed burning plan, including fire lanes, weather conditions, wind speed and direction, timber type, fuel conditions, manpower, and procedures for obtaining a burn permit.
 - b. Develop a forest fire prevention plan, including fire lanes, section roads, prescribed burning, and emergency notification procedures.
36. Identify and discuss forest insects and diseases.
- a. Define the terms associated with forest insects and diseases, including wood damage, leaf eaters, wood eaters, epidemic, predator, habitat, diseases, and signs of damage.

- b. Identify insect and disease damage, including comparing the damage observed to the insect that caused the damage.
 - c. Identify the insect or disease with the symptoms of damage, including leaf eaters, wood eaters, sap eaters, phloem eaters, core borers, root feeders, and terminal feeders.
37. Discuss control methods of forest insects and diseases.
- a. Describe the various methods used to control insects and diseases, including direct control and indirect control.
 - b. Identify the reasons for identifying insect and disease damage, including prevention of epidemics and loss of timber volume.
 - c. Describe aerial forest detection procedures, including those for insect and disease problems.

Appendix A: Proposed Standards for Postsecondary Forestry Technology Programs¹

The following standards were adopted from *Standards and Procedures for Recognizing Educational Programs in Forest Technology*, as published on the Society of American Foresters Web site. For more information on certification of postsecondary Forestry Technology programs, see the Society's Web site at <http://www.safnet.org/education/TechRecStd121604.pdf>

Abbreviation	Description
Dendro	Dendrology: Field identification of regionally important species by leaves, twigs, bark, and fruit characteristics; knowledge of family, genus, and species of each specimen; knowledge of species association and succession; knowledge of the major commercial trees in North America and their uses; understanding of the use of dichotomous keys.
ForEco	Forest Ecology: Plant succession; site; soils; silvics; environmental protection; weather and climate influences; relations of trees to other organisms; biodiversity; ecosystems.
Silvic	Silviculture: Methods of regeneration; site preparation; planting practices; intermediate treatments; nursery practice; seed orchards; pesticide use and application; prescribed burning; pre-commercial thinning; commercial thinning; and harvest cutting.
Protec	Protection: Fire management; regional problems and control of insects, diseases, and animal damage; threats to forest health.
Meas	Measurement: Forest measuring equipment; log scaling practices; forest product measurement; sampling statistics; cruising and inventory techniques; log rules and volume tables; log and tree grading; growth measurement; computer applications and usage.
Survey	Land Surveying: Hand compass; surveying equipment and procedures; pacing and chaining; map reading; deed and title search; land descriptions; computer mapping; global positioning systems (GPS); geographic information systems.
Photo	Aerial Photo Interpretation: Set up stereo for viewing; scale; height measurement; type mapping; road location; bearings and distances; area determination; identification and interpretation.

¹ Society of American Foresters. (2004). *Standards and Procedures for Recognizing Educational Programs in Forest Technology*. Retrieved December 11, 2006, from <http://www.safnet.org/education/TechRecStd121604.pdf>

Safety	Woods Safety: Basic first aid; identification of hazards; hand and power tool safety, pesticide/herbicide safety.
Harvest	Harvesting Techniques: Harvesting systems; cost analysis; logging plans; wood identification; wood products; road layout and construction; best management practices (BMP's).
Multiuse	Multiple Use of Forest Lands: Wildlife; fish habitat; recreation; wilderness; watershed; timber; range; minerals; public conflicts and public participation.
Mgmt	Forest Management Practices: Timber appraisal; contracts; forest management principles; principles of ecosystem (landscape) based management; regional forest management regulations; sustainable forest management concepts/certification; record keeping and basic accounting.
HRM	Principles of Human Resource Management: Human behavior; groups, individuals; motivation; leadership; team building and dynamics; planning; decision-making; rating and evaluation; controlling the workforce; conflict resolution; and ethics.

Appendix B: Related Academic Standards²

Reading

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause/effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)

Mathematics Computation

- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations

Applied Mathematics

- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)

Language

- L1 Usage (pronoun, tense, subject/verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)

Spelling

- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
- S3 Structural Unit (root, suffix)

² CTB/McGraw-Hill LLC. (1994). *Tests of adult basic education, Forms 7 and 8*. Monterey, CA: Author. Reproduced with permission of CTB/McGraw-Hill LLC. TABE is a registered trademark of The McGraw-Hill Companies, Inc. Copyright © 1994 by CTB/McGraw-Hill LLC. Reproduction of this material is permitted for educational purposes only.

Appendix C: 21st Century Skills³

CS1 Global Awareness

- Using 21st century skills to understand and address global issues
- Learning from and working collaboratively with individuals representing diverse cultures, religions, and lifestyles in a spirit of mutual respect and open dialogue in personal, work, and community contexts
- Promoting the study of non-English language as a tool for understanding other nations and cultures

CS2 Financial, Economic, and Business Literacy

- Knowing how to make appropriate personal economic choices
- Understanding the role of the economy and the role of business in the economy
- Applying appropriate 21st century skills to function as a productive contributor within an organizational setting
- Integrating oneself within and adapting continually to our nation's evolving economic and business environment

CS3 Civic Literacy

- Being an informed citizen to participate effectively in government
- Exercising the rights and obligations of citizenship at local, state, national, and global levels
- Understanding the local and global implications of civic decisions
- Applying 21st century skills to make intelligent choices as a citizen

CS4 Information and Communication Skills

- Information and media literacy skills: Analyzing, accessing, managing, integrating, evaluating, and creating information in a variety of forms and media; understanding the role of media in society
- Communication skills: Understanding, managing, and creating effective oral, written, and multimedia communication in a variety of forms and contexts

CS5 Thinking and Problem-Solving Skills

- Critical thinking and systems thinking: Exercising sound reasoning in understanding and making complex choices, understanding the interconnections among systems
- Problem identification, formulation, and solution: Ability to frame, analyze, and solve problems
- Creativity and intellectual curiosity: Developing, implementing, and communicating new ideas to others, staying open and responsive to new and diverse perspectives

CS6 Interpersonal and Self-Directional Skills

- Interpersonal and collaborative skills: Demonstrating teamwork and leadership, adapting to varied roles and responsibilities, working productively with others, exercising empathy, respecting diverse perspectives
- Self-direction: Monitoring one's own understanding and learning needs, locating appropriate resources, transferring learning from one domain to another
- Accountability and adaptability: Exercising personal responsibility and flexibility in personal, workplace, and community contexts; setting and meeting high standards and goals for one's self and others; tolerating ambiguity

³ 21st century skills. (n.d.). Washington, DC: Partnership for 21st Century Skills.

- Social responsibility: Acting responsibly with the interests of the larger community in mind; demonstrating ethical behavior in personal, workplace, and community contexts