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Florida Department of Education
Curriculum Framework

Program Title: **Land Resources Technology**
Program Type: **Career Preparatory**
Career Cluster: **Agriculture, Food and Natural Resources**

Secondary – Career Preparatory	
Program Number	8913000
CIP Number	0715059902
Grade Level	9-12, 30, 31
Standard Length	4 credits
Teacher Certification	AGRICULTUR 1 @2 WSP OPER @7 G
CTSO	FPSA or FFA
SOC Codes (all applicable)	17-3025
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food & Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the land resources sector of the Agriculture, Food & Natural Resources career cluster.

The content includes but is not limited to knowledge of federal, state, and local regulations; ecosystem awareness; problem recognition; water quality issues; solid and liquid waste management issues; air quality issues; managing hazardous materials; managing forests, wetlands, fisheries, and wildlife; planning and administering land use; protecting resources;

conducting site assessments; sampling procedures; safety procedures; compliance monitoring and quality assurance procedures; and instruction in environmental technology.

Program Structure

This program is a planned sequence of instruction consisting of four courses and two occupational completion points.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8913010	Introduction to Environmental Technology	1 credit	17-3025	2
	8913020	Environmental Technology 2	1 credit		2
B	8913030	Land Resources 3	1 credit	17-3025	3
	8913040	Land Resources 4	1 credit		3

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Career and Technical Student Organization (CTSO)

FPSA or FFA is the appropriate career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Essential Skills

Essential skills identified by the Division of Career and Adult Education have been integrated into the standards and benchmarks of this program. These skills represent the general knowledge and skills considered by industry to be essential for success in careers across all career clusters. Students preparing for a career served by this program at any level should be able to demonstrate these skills in the context of this program. A complete list of Essential Skills and links to instructional resources in support of these Essential Skills are published on the CTE Essential Skills page of the FL-DOE website (http://www.fldoe.org/workforce/dwdframe/essential_skills.asp).

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's IEP or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their postsecondary service provider. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an Individual Educational Plan (IEP) served in Exceptional Student Education or ESE) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note postsecondary curriculum cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number (for eligible students with disabilities).

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation. A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (http://www.fldoe.org/articulation/CCD/default.asp).

Standards

After successfully completing this program, the student will be able to perform the following:

01.0 Describe hydrology.
02.0 Practice safety skills and procedures.
03.0 Demonstrate sampling procedures.
04.0 Discuss related standards and regulations.
05.0 Conduct site assessment.
06.0 Describe related geologic principles.
07.0 Manage wetlands.
08.0 Manage wildlife.
09.0 Manage forests.
10.0 Identify career opportunities and organizational dynamics.
11.0 Describe water treatment techniques.
12.0 Describe stormwater systems.
13.0 Manage data and physical resources.
14.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems.
15.0 Manage hazardous materials.
16.0 Control incidents.
17.0 Prepare a plan.
18.0 Perform remediation.
19.0 Collect and dispose of solid waste.
20.0 Identify continuing education needs and opportunities.
21.0 Demonstrate language arts knowledge and skills.
22.0 Demonstrate mathematics knowledge and skills.
23.0 Demonstrate science knowledge and skills.
24.0 Use oral and written communication skills in creating, expressing and interpreting information and ideas.
25.0 Solve problems using critical thinking skills, creativity and innovation.
26.0 Use information technology tools.
27.0 Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment.
28.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
29.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives.
30.0 Describe the importance of professional ethics and legal responsibilities.
31.0 Explain the importance of employability skill and entrepreneurship skills.
32.0 Demonstrate personal money-management concepts, procedures, and strategies.
33.0 Evaluate wetlands management practices.
34.0 Evaluate wildlife management procedures.
35.0 Evaluate forest management techniques.
36.0 Collect and dispose of solid waste.
37.0 Manage fires.
38.0 Manage pests.
39.0 Manage ecosystems.
40.0 Plan and administer land use.
41.0 Protect resources.
42.0 Demonstrate employability and human relation skills.

43.0 Discuss restoration ecology.

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Student Performance Standards

Course Title: **Introduction to Environmental Technology**
Course Number: **8913010**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the areas of hydrology, environmental standards and regulations, site assessment, geologic principles, career opportunities; scientific and research concepts; principles of leadership; and employability, and human relations skills. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

01.0 Describe hydrology--The student will be able to:

- 01.01 Define basic hydrological terms.
- 01.02 Explain surface water systems.
- 01.03 Explain ground water systems.
- 01.04 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 01.05 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.

02.0 Practice safety skills and procedures--The student will be able to:

- 02.01 Demonstrate proper safety precautions and use of common laboratory, testing, and personal protective equipment.
- 02.02 Identify and utilize safe work practices.
- 02.03 Identify physical, chemical, biological, and zoological hazards.
- 02.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, Occupational Safety and Health Agency (OSHA), and Hazard Communication (HAZCOM) regulations.
- 02.05 Determine, review, and follow regulations.
- 02.06 Develop and maintain appropriate safety records.
- 02.07 Identify and describe “on the job” hazards and risks including fire/explosive, lead asbestos, and weather hazards.
- 02.08 Perform lifting activities safely.
- 02.09 Identify ladder safety and fall protection.
- 02.10 Become certified in first aid/CPR and describe First Responder responsibilities.

03.0 Demonstrate sampling procedures–The student will be able to:

- 03.01 Define sampling objectives and protocol.
- 03.02 Operate, calibrate, and maintain sampling equipment.
- 03.03 Develop sampling strategy.
- 03.04 Perform applicable field measurements.

03.05 Appropriately preserve, document, and dispose of samples.
03.06 Identify cross-contamination and other risks associated with sampling.
03.07 Describe, plan, and utilize quality assurance practices.
03.08 Submit samples for analysis.
03.09 Perform periodic follow-up sampling.

04.0 Discuss related standards and regulations--The student will be able to:

04.01 Explain the importance and impacts of local, state, and federal regulations and required documentation.
04.02 Describe the Florida Administrative Code's (F.A.C.) impact on environmental issues.
04.03 Discuss the Clean Water Act.
04.04 Identify local, state, and national regulatory agencies and discuss their roles in relation to state and federal laws and statures.
04.05 Research how rules and laws are made and mandated.
04.06 Research and report how endangered species get listed.
04.07 Describe permitting procedures.
04.08 Identify regulation resources.
04.09 Describe various licensing procedures.

05.0 Conduct site assessment--The student will be able to:

05.01 Identify the purposes of site assessment.
05.02 Describe required documentation.
05.03 Identify the phases of site assessment.
05.04 Obtain background design information
05.05 Verify blueprint accuracy.
05.06 Conduct manual survey.
05.07 Obtain physical and performance measurements.
05.08 Determine system safety impacts.
05.09 Determine possible nature and extent of exposure.
05.10 Assess needed equipment and processes.
05.11 Identify type of mechanical systems required.
05.12 Determine operational criteria.
05.13 Recommend corrective action.

06.0 Describe related geologic principles--The student will be able to:

06.01 Explain the geological history of Florida.
06.02 Create a soil profile and describe the associated components.
06.03 Evaluate soil profiles, land-capability classes, and soil conservation practices.
06.04 Interpret legal descriptions of land.
06.05 Identify mapping and surveying techniques and equipment.

07.0 Manage wetlands--The student will be able to:

07.01 Identify ecosystems.
07.02 Discuss the structure and function of wetlands.
07.03 Define limits of wetlands.
07.04 Discuss habitat value.

07.05 Identify fauna and flora.
07.06 Determine desirable vs. nuisance plant and animal species.

08.0 Manage wildlife--The student will be able to:

08.01 Identify and compare wildlife species.
08.02 Identify and describe life histories of game species.
08.03 Identify and describe life histories of non-game species.
08.04 Discuss urban wildlife management.
08.05 Describe community ecology.
08.06 Identify and practice wildlife techniques and principles.
08.07 Discuss population dynamics.

09.0 Manage forests--The student will be able to:

09.01 Describe dendrology.
09.02 Describe silviculture.
09.03 Identify and demonstrate replanting techniques.
09.04 Discuss harvesting techniques.
09.05 Identify timber stand improvement.
09.06 Identify timber and forest products.

10.0 Identify career opportunities and organizational dynamics--The student will be able to:

10.01 Identify careers and opportunities in the following fields: Surface/stormwater, drinking water, wastewater, groundwater, land resources, air quality, solid waste, and HAZMAT.
10.02 Compare supervisory and administrative responsibilities.
10.03 Identify organizational structures.
10.04 Identify team building communication skills.
10.05 Identify problem-solving techniques.
10.06 Identify employee responsibility/benefits.
10.07 Identify legal aspects of personnel relations.
10.08 Communicate effectively in verbal, written, and nonverbal modes.
10.09 Recognize and demonstrate good listening skills.
10.10 Conduct small informal and formal group meetings.
10.11 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.

26.0 Demonstrate language arts knowledge and skills--The students will be able to: AF2.0

26.05 Locate, comprehend and evaluate key elements of oral and written information. AF2.4
26.06 Draft, revise, and edit written documents using correct grammar, punctuation and vocabulary. AF2.5
26.07 Present information formally and informally for specific purposes and audiences. AF2.9

27.0 Demonstrate mathematics knowledge and skills--The students will be able to: AF3.0

27.05 Demonstrate knowledge of arithmetic operations. AF3.2

27.06 Analyze and apply data and measurements to solve problems and interpret documents. AF3.4
27.07 Construct charts/tables/graphs using functions and data. AF3.5

28.0 Demonstrate science knowledge and skills--The students will be able to: AF4.0

28.05 Discuss the role of creativity in constructing scientific questions, methods and explanations. AF4.1
28.06 Formulate scientifically investigable questions, construct investigations, collect and evaluate data, and develop scientific recommendations based on findings. AF4.3

29.0 Use oral and written communication skills in creating, expressing and interpreting information and ideas--The students will be able to:

29.05 Select and employ appropriate communication concepts and strategies to enhance oral and written communication in the workplace. CM1.0
29.06 Locate, organize and reference written information from various sources. CM3.0
29.07 Design, develop and deliver formal and informal presentations using appropriate media to engage and inform diverse audiences. CM5.0
29.08 Interpret verbal and nonverbal cues/behaviors that enhance communication. CM6.0
29.09 Apply active listening skills to obtain and clarify information. CM7.0
29.10 Develop and interpret tables and charts to support written and oral communications. CM8.0
29.11 Exhibit public relations skills that aid in achieving customer satisfaction. CM10.0

30.0 Solve problems using critical thinking skills, creativity and innovation--The students will be able to:

30.05 Employ critical thinking skills independently and in teams to solve problems and make decisions. PS1.0
30.06 Employ critical thinking and interpersonal skills to resolve conflicts. PS2.0
30.07 Identify and document workplace performance goals and monitor progress toward those goals. PS3.0
30.08 Conduct technical research to gather information necessary for decision-making. PS4.0

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Student Performance Standards

Course Title: **Environmental Technology 2**
Course Number: **8913020**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the areas of water treatment, stormwater systems, Geographic Informational and Global Positioning Systems, environmental standards and regulations, career opportunities; scientific and research concepts; principles of leadership; and employability, and human relations skills. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

02.0 Practice safety skills and procedures--The student will be able to:

- 02.11 Identify safety procedures for: Wells, pumps, electrical equipment, motor vehicles, buildings, and other necessary equipment.
- 02.12 Handle compressed gasses, solids, and liquids safely.
- 02.13 Summarize “Right of Access” law.
- 02.14 Summarize “Confined Space” regulations.
- 02.15 Identify Zero Tolerance policies.
- 02.16 Identify employee limitations.
- 02.17 Identify appropriate decontamination procedures.
- 02.18 Identify principles of toxicology.
- 02.19 Identify routes of exposure.
- 02.20 Identify respirator safety procedures.
- 02.21 Discuss history of hazardous materials and hazardous categories.
- 02.22 Discuss common chemical compatibility.

04.0 Discuss related standards and regulations--The student will be able to:

- 04.10 Identify appropriate agencies and their functions
- 04.11 Describe the role of environmental protection.
- 04.12 Interpret the Regulatory File System.
- 04.13 Create, evaluate and present a well-head protection plan.

10.0 Identify career opportunities and organizational dynamics--The student will be able to:

- 10.11 Recognize and demonstrate effective communications skills in the workplace.
- 10.12 Design and conduct presentations.

11.0 Describe water treatment techniques--The student will be able to:

- 11.01 Understand pretreatment, primary, secondary, and tertiary treatment processes of wastewater.
- 11.02 Describe disposal options.
- 11.03 Identify septic tanks types and functions.

12.0 Describe stormwater systems--The student will be able to:

12.01 Research current construction trends and methods of stormwater systems.
12.02 Define topography and its effects on stormwater.

13.0 Manage data and physical resources--The student will be able to:

13.01 Utilize word processing, databases, computer graphics, statistics programs, spreadsheets, Internet, GIS, and security.
13.02 Identify possible funding sources.
13.03 Prepare budgets and purchase orders.
13.04 Prepare a time management plan.
13.05 Utilize information databases.
13.06 Locate and interpret printed reference materials.
13.07 Describe network opportunities.
13.08 Maintain necessary/required record keeping practices and procedures.
13.09 Keep inventory, time sheets, and equipment maintenance logs.
13.10 Identify suppliers and technical resources.

14.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems--The student will be able to:

14.01 Define GIS and its function.
14.02 Use GIS software.
14.03 Learn GIS applications.
14.04 Download LANDSTAT Satellite system into GIS.
14.05 Develop a GIS model.
14.06 Define GPS and its function.
14.07 Collect GPS data and load on GIS.
14.08 Research and identify other remote sensing tools.

15.0 Manage hazardous materials--The student will be able to:

15.01 Describe flow and life cycles of materials.
15.02 Identify proper chemical handling and storage guidelines.
15.03 Describe material management procedures.
15.04 Identify waste minimization, pollution prevention and alternatives to disposal.
15.05 Describe waste determination procedures.
15.06 Describe storage tank procedures.
15.07 Identify biochemical/medical waste.
15.08 Describe shipping and transportation procedures of hazardous materials.
15.09 Identify and interpret phase I and II audits.
15.10 Interpret closure reports.
15.11 Write contamination assessment reports.

16.0 Control incidents--The student will be able to:

16.01 Identify and describe reasons for controlling incidents.
16.02 Describe levels of response.
16.03 Determine and use proper chain of command.

16.04 Determine methods of control.
16.05 Demonstrate site access restriction methods.
16.06 Identify appropriate authorities to be notified.
16.07 Place equipment appropriately.
16.08 Orient zones.
16.09 Identify possible geographic hazards.
16.10 Identify media protocol and procedures for communicating with the public.
16.11 Prepare a press release for a mock incident

17.0 Prepare a plan--The student will be able to:

17.01 Describe the need for and types of pre-planning.
17.02 Identify and select necessary agency involvement.
17.03 Identify possible contamination zones.
17.04 Create contention plans for hurricane, tornadoes, floods, fires, and nuclear accidents.
17.05 Discuss Superfund Amendments Reauthorization Act (SARA) also known as the Emergency Planning and Community Right-to-Know Act (EPCRA) regulations.
17.06 Create plan for deployment.
17.07 Evaluate contingency plans.
17.08 Write a contingency plan.
17.09 Conduct mock disaster activities.

18.0 Perform remediation--The student will be able to:

18.01 Research appropriate cleaning methods.
18.02 Create a plan for a disaster clean up including needed materials and equipment.
18.03 Conduct entry and closure methods.
18.04 Identify contamination removal procedures.
18.05 Design a site/system cleanliness verification procedure.
18.06 Identify tear down and demobilization procedures.

19.0 Collect and dispose of solid waste--The student will be able to:

19.01 Describe history of solid waste disposal.
19.02 Identify types of waste.
19.03 Research and evaluate solid waste disposal options. (Landfill, incineration, and composting, etc.)

20.0 Identify continuing education needs and opportunities--The student will be able to:

20.01 Determine continuing education needs/goals.
20.02 Identify available educational and financial resources.
20.03 Identify appropriate professional associations and attend meetings where applicable.
20.04 Read and review trade journals.

26.0 Use information technology tools--The students will be able to:

26.01 Use Personal Information Management (PIM) applications to increase workplace efficiency. IT1.0

26.02 Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications. IT2.0
26.03 Employ computer operations applications to access, create, manage, integrate, and store information. IT3.0
26.04 Employ collaborative/groupware applications to facilitate group work. IT4.0

27.0 Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment--The students will be able to:

27.01 Describe the nature and types of business organizations. SY1.0
27.02 Explain the effect of key organizational systems on performance and quality.
27.03 List and describe quality control systems and/or practices common to the workplace. SY2.0
27.04 Explain the impact of the global economy on business organizations.

28.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance--The students will be able to:

28.01 Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments. SHE1.0
28.02 Explain emergency procedures to follow in response to workplace accidents.
28.03 Create a disaster and/or emergency response plan. SHE2.0

29.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives--The students will be able to:

29.01 Employ leadership skills to accomplish organizational goals and objectives. LT1.0
29.02 Establish and maintain effective working relationships with others in order to accomplish objectives and tasks. LT3.0
29.03 Conduct and participate in meetings to accomplish work tasks. LT4.0
29.04 Employ mentoring skills to inspire and teach others. LT5.0

30.0 Describe the importance of professional ethics and legal responsibilities--The students will be able to:

30.01 Evaluate and justify decisions based on ethical reasoning. ELR1.0
30.02 Evaluate alternative responses to workplace situations based on personal, professional, ethical, legal responsibilities, and employer policies. ELR1.1
30.03 Identify and explain personal and long-term consequences of unethical or illegal behaviors in the workplace. ELR1.2
30.04 Interpret and explain written organizational policies and procedures. ELR2.0

31.0 Explain the importance of employability skill and entrepreneurship skills--The students will be able to:

31.01 Identify and demonstrate positive work behaviors needed to be employable. ECD1.0

31.02 Develop personal career plan that includes goals, objectives, and strategies. ECD2.0
31.03 Examine licensing, certification, and industry credentialing requirements. ECD3.0
31.04 Maintain a career portfolio to document knowledge, skills, and experience. ECD5.0
31.05 Evaluate and compare employment opportunities that match career goals. ECD6.0
31.06 Identify and exhibit traits for retaining employment. ECD7.0
31.07 Identify opportunities and research requirements for career advancement. ECD8.0
31.08 Research the benefits of ongoing professional development. ECD9.0
31.09 Examine and describe entrepreneurship opportunities as a career planning option. ECD10.0

32.0 Demonstrate personal money-management concepts, procedures, and strategies--The students will be able to:

32.01 Identify and describe the services and legal responsibilities of financial institutions. FL2.0
32.02 Describe the effect of money management on personal and career goals. FL3.0
32.03 Develop a personal budget and financial goals. FL3.1
32.04 Complete financial instruments for making deposits and withdrawals. FL3.2
32.05 Maintain financial records. FL3.3
32.06 Read and reconcile financial statements. FL3.4
32.07 Research, compare and contrast investment opportunities.

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Student Performance Standards

Course Title: **Land Resources 3**
Course Number: **8913030**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the areas of managing wetlands, wildlife, forest, fire, pests, and ecosystems, solid waste disposal, scientific and research concepts; principles of leadership; and employability, and human relations skills. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

33.0 Evaluate wetlands management practices--The student will be able to:

- 33.01 Research control treatments for undesirable plants.
- 33.02 Discuss mitigation techniques
- 33.03 Evaluate impacts on wetlands.

34.0 Evaluate wildlife management procedures--The student will be able to:

- 34.01 Discuss basic mammalogy.
- 34.02 Discuss basic ornithology.
- 34.03 Discuss basic herpetology.
- 34.04 Use a dichotomous key.
- 34.05 Conduct experimental design and statistical analysis.
- 34.06 Conduct biological data collection.
- 34.07 Interpret data.
- 34.08 Investigate system evolution.
- 34.09 Identify common wildlife diseases and parasites.

35.0 Evaluate forest management techniques--The student will be able to:

- 35.01 Identify surveying techniques.
- 35.02 Perform timber cruising activity.
- 35.03 Perform a pacing exercise.
- 35.04 Calculate area using chains.
- 35.05 Calculate timber volumes using a Biltmore stick.
- 35.06 Identify and discuss Forestry Best Management Practices (BMP).
- 35.07 Research forestry/nursery production practices.
- 35.08 Discuss marketability of forests.
- 35.09 Identify timber marketing strategies.
- 35.10 Identify related forestry equipment.

36.0 Collect and dispose of solid waste--The student will be able to:

- 36.01 Demonstrate the construction of artificial reefs.
- 36.02 Identify disposal methods of hazardous and biomedical waste.

36.03 Describe recycling methods.
36.04 Visit a Materials Recycling Facility.

37.0 Manage fires--The student will be able to:

37.01 Describe the history of fire usage in Florida.
37.02 Discuss the effects of prescribed burns and wildfires on communities in Florida.
37.03 Identify and discuss safety equipment and practices related to fire management.
37.04 Identify and discuss wildfire suppression techniques.
37.05 Describe prescribed burn techniques.
37.06 Evaluate site for prescribed burn.
37.07 Discuss fire weather behavior.
37.08 Discuss seasonal ecological affects of burning.
37.09 Write a prescription for a prescribed burn.
37.10 Visit a prescribed burn site.
37.11 Evaluate the burn.

38.0 Manage pests--The student will be able to:

38.01 Discuss botany and plant taxonomy.
38.02 Discuss common pests.
38.03 Classify insects using a dichotomous key
38.04 Describe life cycles of common pests.
38.05 Describe biological, chemical, and cultural methods of managing plant pests.
38.06 Identify and select an appropriate control for each type of pest and/or weed.
38.07 Describe the principles and benefits of integrated pest management.

39.0 Manage ecosystems--The student will be able to:

39.01 Identify habitat types of Florida.
39.02 Identify archeological and historical perspectives of ecosystems.
39.03 Describe specific species associations for habitats.
39.04 Describe how ecosystems interrelate.
39.05 Research associated species.
39.06 Identify management techniques.

40.0 Plan and administer land use--The student will be able to:

40.01 Discuss the geography of the area.
40.02 Review historical information of the area.
40.03 Review section, township, and range maps.
40.04 Review aerial maps.
40.05 Interpret topographical and flood plain maps.
40.06 Forecast demographic patterns.
40.07 Discuss population dynamics.
40.08 Conduct population studies.
40.09 Discuss growth management.
40.10 Discuss coastal management issues.
40.11 Describe special protection zones.
40.12 Research per capita land consumption
40.13 Compare consumptive and non-consumptive land uses.

40.14 Describe and compare land uses including commercial, residential, recreational and agricultural uses.
40.15 Design a balanced land use plan.

41.0 Protect resources--The student will be able to:

41.01 Identify and discuss archeological sites.
41.02 Describe Endangered Species Act.
41.03 Research regulations regarding protection of wildlife resources.
41.04 Research wetland protection practices.
41.05 Identify soil protection practices.
41.06 Identify related law enforcement careers and responsibilities.
41.07 Identify personal and of jurisdictional rights of landowners.

42.0 Demonstrate employability and human relation skills--The student will be able to:

42.01 Enhance oral communications and presentation skills.
42.02 Demonstrate interpersonal (nonverbal) communication skills.
42.03 Demonstrate good listening skills.
42.04 Discuss media relations.
42.05 Create a media campaign for an environmental issue.
42.06 Develop audience appropriate communications.

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Student Performance Standards

Course Title: **Land Resources 4**
Course Number: **8913040**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the management of pests and ecosystems, planning and administering land usage, ecology restoration, career opportunities; scientific and research concepts; principles of leadership; and employability, and human relations skills. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

38.0 Manage pests--The student will be able to:

- 38.08 Discuss urban entomology.
- 38.09 Assess environmental impact of pests.
- 38.10 Conduct pest population studies.
- 38.11 Discuss pesticide safety/regulations.
- 38.12 Discuss basic toxicology.
- 38.13 Identify chemicals used in pest management.
- 38.14 Collect biological data.

39.0 Manage ecosystems--The student will be able to:

- 39.07 Describe political, biological, economical, and sociological impacts on managing ecosystems.
- 39.08 Describe the effects of manipulation of species composition.
- 39.09 Compare population dynamics.
- 39.10 Discuss the effects of genetic isolation.
- 39.11 Discuss bio-diversity.
- 39.12 Evaluate how external factors affect communities.
- 39.13 Research public use.
- 39.14 Identify remote sensing techniques.
- 39.15 Identify vegetative monitoring techniques
- 39.16 Conduct vegetation analysis.
- 39.17 Perform sampling, management, and analysis of data.
- 39.18 Practice ecological ethics.

40.0 Plan and administer land use--The student will be able to:

- 40.16 Conduct an environmental assessment for a specific site.
- 40.17 Conduct a property title search.
- 40.18 Describe different kinds of acquisitions.
- 40.19 Discuss concurrency management system.
- 40.20 Research service comprehensive plans.
- 40.21 Audit conservation as a means to protect and restore.
- 40.22 Discuss the effects of drainage on resources.

40.23 Discuss unique environmental features.
40.24 Analyze sanitary sewer, water supply, and sewer needs.
40.25 Discuss the need for inter-group coordination activities.
40.26 Conduct a compatibility analysis.
40.27 Prepare and write a conservation plan for a specific parcel of land.
40.28 Write a capital improvement plan.
40.29 Project maintenance management costs.

41.0 Demonstrate employability and human relation skills--The student will be able to:

41.08 Write a communication plan.
41.09 Research ecotourism opportunities.
41.10 Design an ecotour for an environmental area in the community.
41.11 Perform public awareness activities.
41.12 Design educational materials.

42.0 Discuss restoration ecology--The student will be able to:

42.07 Review geology, pedology, and hydrology.
42.08 Research of vegetation dynamics.
42.09 Determine requirements for preserving plant viability.
42.10 Propagate and grow plants through sexual and/or asexual reproduction.
42.11 Select and prepare plants for transporting and transplanting.
42.12 Install plant materials.
42.13 Describe restoration techniques.
42.14 Research wetlands reclamation and uplands restoration.
42.15 Diagnose restoration from a systems approach.
42.16 Discuss mine reclamation.
42.17 Identify related equipment.
42.18 Research applicable monitoring techniques.