July 2000

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Power and Transportation Technology
Occupational Area:	Technology Education
Program Numbers:	8601200
CIP Number:	0821.010500
Grade Level:	Secondary 9-12, & 30, 31
Standard Length:	3 Credits
Facility Design Code:	243, Related 808, 810, 849, 851, 852
CTSO:	Florida Technology Student Association (FL-TSA)
Certification:	INDUS ARTS @4 6, I ART-TEC 1 @2 AUTO MECH @7G, GASENG RPR @7G TEC MECH @7G, AUTO IND @7G GEN SHOP @4, TRANSPORT @4 DESEL MECH @7G, AIR MECH @7G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of power and transportation technology. This program focuses on transferable skills and stresses understanding and demonstration of the technological tools, machines, instruments, materials, processes and systems in business and industry.

The content includes, but is not limited to, a study of power systems and the kinds and sources of energy. The content and activities will also include the study of entrepreneurship, safety, and leadership skills.

Listed below are the courses that make up this program.

8601210 - Power and Transportation Technology I
8601220 - Power and Transportation Technology II
8601230 - Power and Transportation Technology III

II. **LABORATORY ACTIVITIES:** Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the tools and materials appropriate to the course content.

III. **SPECIAL NOTE:** The Florida Technology Student Association (FL-TSA) is the appropriate Career and Technical Student Organization for providing leadership training experiences and reinforcing specific vocational skills. Career and Technical Student Organizations, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, FAC. FL-TSA information can be obtained from the web site at <http://www.florida-tsa.net>.

Advanced Applications in Technology (AAiT) - course number 8601900 is appropriate to be used for content area continuation in this program after all three credits of this program have been completed. The purpose of this course is to provide students with the opportunity to develop a school based project from "vision" to "reality". Working in teams to design, engineer, manufacture, construct, test, redesign, test again; and then produce a finished

"project". This would involve using ALL the knowledge previously learned, not only in Technology Education but also across the curriculum. See the (AAiT) framework for more information.

Work-Based Experience (WBE) - course number 8601800 is the appropriate course to provide Technology Education students with the opportunity, as Student Learners, to gain real world practical, first-hand exposure in broad occupational clusters or industry sectors through a structured, compensated or uncompensated experience. Work-Based Experience is also designed to give the Student Learners an opportunity to apply and integrate the knowledge, skills, and abilities acquired during their School-Based Experience to actual work situations independent of school facilities. At least one credit of a Technology Education program consisting of three credits must be completed before enrolling in WBE. See the (WBE) framework for more information.

The Intermediate and Advance courses in this program may articulate into postsecondary Tech-Prep 2 + 2 programs when taken in sequence. Tech-Prep 2 + 2 programs require articulation agreements between secondary and postsecondary educational agencies.

When a secondary student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student shall master to earn credit must be specified on an individual basis in each students Individual Educational Plan (IEP).

IV. **INTENDED OUTCOMES:** After successfully completing this program, the student will be able to:

01.0 Demonstrate the ability to work safely with a variety of technologies.
02.0 Demonstrate interpersonal skills as they relate to the workplace.
03.0 Identify and apply methods of information acquisition and utilization.
04.0 Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.
05.0 Demonstrate and apply design/problem-solving processes.
06.0 Express an understanding of technological systems and their complex interrelationships.
07.0 Demonstrate the ability to properly identify, organize, plan, and allocate resources.
08.0 Discuss individual interests and aptitudes as they relate to a career.
09.0 Demonstrate employability skills.
10.0 Demonstrate an understanding of entrepreneurship.
11.0 Make an informed and meaningful career choice.
12.0 Describe sources of energy.
13.0 Demonstrate technical knowledge and skills about steam power technology.
14.0 Demonstrate technical knowledge and skills about diesel engine power technology.
15.0 Demonstrate technical knowledge and skills about internal combustion power technology.
16.0 Demonstrate technical knowledge and skills about hydraulic and pneumatic power technology.

17.0 Demonstrate technical knowledge and skills about electric power technology.
18.0 Demonstrate technical knowledge and skills about jet engine power technology.
19.0 Demonstrate technical knowledge and skills about rocket engine power technology.
20.0 Demonstrate technical knowledge and skills about solar cells and fuel cells.
21.0 Demonstrate technical knowledge and skills about nuclear power technology.
22.0 Perform advanced study and technical skills related to energy and power.
23.0 Operate a computer utilizing a program related to energy and power.
24.0 Demonstrate technical knowledge and skills about powered transportation systems.
25.0 Measure and report the power and efficiency of power producing systems.
26.0 Conduct a research and experimentation project on an energy and power system.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8601210
Course Title: Power and Transportation Technology I
Course Credit: 1

COURSE DESCRIPTION: This course provides students with an introduction to the knowledge, human relations, and technical skills of energy and power technology.

01.0 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--The student will be able to:

- 01.01 Select appropriate tools, procedures, and/or equipment needed to produce a product.
- 01.02 Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
- 01.03 Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.
- 01.04 Follow laboratory safety rules and procedures.
- 01.05 Demonstrate good housekeeping at work station within total laboratory.
- 01.06 Identify color-coding safety standards.
- 01.07 Explain fire prevention and safety precautions and practices for extinguishing fires.
- 01.08 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

02.0 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
- 02.02 Participate as a member of a team.
- 02.03 Teach others new skills.
- 02.04 Identify skills needed to serve clients/customers.
- 02.05 Demonstrate leadership skills.
- 02.06 Describe strategies necessary for negotiating agreements.
- 02.07 Demonstrate the application of skills necessary to work with people of diverse backgrounds.
- 02.08 Form an understanding and appreciation for work after listening to or observing technology workers.
- 02.09 Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
- 02.10 Form an understanding and appreciation for the roles and work of co-workers.

03.0 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND

03.02 Identify and describe methods of information acquisition and evaluation.
03.03 Discuss advantages and disadvantages in the application of technologies.
03.04 Produce a plan to organize and maintain information relevant to emerging technologies.
03.05 Comprehend and communicate information relevant to emerging technologies.
03.06 Demonstrate the use of computers to process information.

04.0 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

04.01 Identify and explain the main and subordinate ideas in a written work.
04.02 Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.
04.03 Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.
04.04 Distinguish fact from opinion.
04.05 Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.
04.06 Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.
04.07 Improve one's own writing by restructuring, correcting errors, and rewriting.
04.08 Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.
04.09 Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.
04.10 Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.
04.11 Compose unified and coherent correspondence, directions, descriptions, explanations and reports.
04.12 Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.
04.13 Conceive and develop ideas about a topic for the purpose of speaking to a group; choose and organize related ideas; present them clearly in Standard English; and evaluate similar presentations by others.
04.14 Use the mathematics of:
- integers, fractions, and decimals;
- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.
04.15 Make estimates and approximations, and judge the reasonableness of a result.
04.16 Use elementary concepts of probability and statistics.
04.17 Draw, read, and analyze graphs, charts, and tables.
04.18 Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and field work.

04.19 Organize and communicate the results obtained by observation and experimentation.
04.20 Apply the basic principles of biology, physics, and chemistry (properties of matter; structure of compounds; concepts of motion; temperature, pressure and volume; work, power, force and energy; machines; human cell structure).
04.21 Identify problems rooted in basic biology, physics, or chemistry (effects of hazardous materials on health and safety, effects of drugs on health, trouble shooting problems on a machine).

05.0 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--The student will be able to:

05.01 Describe and explain steps in the design/problem-solving process.
05.02 Propose solutions to given problems.
05.03 Design and implement the optimal solution to a given problem.
05.04 Document each step of the design/problem-solving process.
05.05 Demonstrate "brainstorming" as a process to solve problems.
05.06 Define "critical thinking" and its value in the problem-solving process.

06.0 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR COMPLEX INTERRELATIONSHIPS--The student will be able to:

06.01 Demonstrate a knowledge of how social, organizational, and technological systems work.
06.02 Explore methods used to monitor and correct performance of technological systems.
06.03 Design and implement an optimal solution to a given problem.
06.04 Outline major historical technological developments or events.
06.05 Identify recent advances in technology.
06.06 Explain problem-solving roles of technology.
06.07 Forecast a technological development or event.
06.08 Define technology.

07.0 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND ALLOCATE RESOURCES--The student will be able to:

07.01 Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
07.02 Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
07.03 Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
07.04 Display a knowledge of the efficient use of human resources.

08.0 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--The student will be able to:

08.01 Describe individual strengths and weaknesses.
08.02 Discuss individual interests related to a career.
08.03 Identify careers within specific areas of technology.

08.04 Explore careers within specific areas of interest.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

09.01 Conduct a job search.
09.02 Secure information about a career.
09.03 Identify documents which may be required when applying for a job interview.
09.04 Complete a job application form correctly.
09.05 Demonstrate competence in job interview techniques.
09.06 Prepare a resume for a job.

10.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

10.01 Define entrepreneurship.
10.02 Describe the importance of entrepreneurship to the American economy.
10.03 List the advantages and disadvantages of business ownership.
10.04 Identify the risks involved in ownership of a business.
10.05 Identify the necessary personal characteristics of a successful entrepreneur.
10.06 Identify the business skills needed to operate a small business efficiently and effectively.

11.0 MAKE AN INFORMED AND MEANINGFUL CAREER CHOICE--The student will be able to:

11.01 Make a tentative occupational choice based on the information learned and interest developed in this course.
11.02 Review tentative occupational choices based on the information learned and interest developed in this course.

12.0 DESCRIBE SOURCES OF ENERGY--The student will be able to:

12.01 Describe sources of thermal energy.
12.02 Describe sources of radiant energy.
12.03 Describe sources of nuclear energy.
12.04 Describe sources of chemical energy.
12.05 Describe sources of electrical energy.
12.06 Describe sources of mechanical energy.
12.07 Describe sources of fluid energy.

13.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT STEAM POWER TECHNOLOGY--The student will be able to:

13.01 Identify and define the key terms, categories, and parts of steam power technology.
13.02 Describe the operating theory and principles of steam engines and steam turbines.
13.03 Explain the uses and applications of steam power engines and systems.
13.04 Identify industries that produce and use steam power systems.
13.05 Describe energy and fuel sources for steam power operations.
13.06 Perform technical skills in building, assembling, maintaining, or operating a steam power system.

14.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT DIESEL ENGINE POWER TECHNOLOGY--The student will be able to:

14.01 Identify and define key terms, categories, and parts of diesel engine power technology.
14.02 Describe the operating theory and principles of diesel engine power technology.
14.03 Explain the uses and applications of diesel engines.
14.04 Identify industries that produce and use diesel engines.
14.05 Describe energy and fuel sources for diesel engines.
14.06 Perform technical skills in building, assembling, maintaining, or operating diesel engines.

15.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INTERNAL COMBUSTION POWER TECHNOLOGY--The student will be able to:

15.01 Identify and define the key terms, categories, and parts of gasoline engine internal combustion technology.
15.02 Describe the operating theory and principles of internal combustion gasoline engines.
15.03 Explain the uses and applications of internal combustion gasoline engines.
15.04 Identify industries that produce and use internal combustion gasoline engines.
15.05 Describe energy and fuel sources for internal combustion gasoline engines.
15.06 Perform technical skills in building, assembling, maintaining, or operating internal combustion gasoline engines.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8601220
Course Title: Power and Transportation Technology II
Course Credit: 1

COURSE DESCRIPTION: This course provides students with an introduction to the knowledge, human relations, and technical skills of energy and power technology.

01.0 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--The student will be able to:

- 01.01 Select appropriate tools, procedures, and/or equipment needed to produce a product.
- 01.02 Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
- 01.03 Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.
- 01.04 Follow laboratory safety rules and procedures.
- 01.05 Demonstrate good housekeeping at work station within total laboratory.
- 01.06 Identify color-coding safety standards.
- 01.07 Explain fire prevention and safety precautions and practices for extinguishing fires.
- 01.08 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

02.0 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
- 02.02 Participate as a member of a team.
- 02.03 Teach others new skills.
- 02.04 Identify skills needed to serve clients/customers.
- 02.05 Demonstrate leadership skills.
- 02.06 Describe strategies necessary for negotiating agreements.
- 02.07 Demonstrate the application of skills necessary to work with people of diverse backgrounds.
- 02.08 Form an understanding and appreciation for work after listening to or observing technology workers.
- 02.09 Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
- 02.10 Form an understanding and appreciation for the roles and work of co-workers.

03.0 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATIONS--The student will be able to:

- 03.01 Define terms related to computers.
- 03.02 Identify and describe methods of information acquisition and evaluation.

03.03 Discuss advantages and disadvantages in the application of technologies.
03.04 Produce a plan to organize and maintain information relevant to emerging technologies.
03.05 Comprehend and communicate information relevant to emerging technologies.
03.06 Demonstrate the use of computers to process information.

04.0 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

04.01 Identify and explain the main and subordinate ideas in a written work.
04.02 Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.
04.03 Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.
04.04 Distinguish fact from opinion.
04.05 Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.
04.06 Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.
04.07 Improve one's own writing by restructuring, correcting errors, and rewriting.
04.08 Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.
04.09 Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.
04.10 Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.
04.11 Compose unified and coherent correspondence, directions, descriptions, explanations and reports.
04.12 Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.
04.13 Conceive and develop ideas about a topic for the purpose of speaking to a group; choose and organize related ideas; present them clearly in Standard English; and evaluate similar presentations by others.
04.14 Use the mathematics of:
- integers, fractions, and decimals;
- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.
04.15 Make estimates and approximations, and judge the reasonableness of a result.
04.16 Use elementary concepts of probability and statistics.
04.17 Draw, read, and analyze graphs, charts, and tables.
04.18 Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and field work.
04.19 Organize and communicate the results obtained by observation and experimentation.

04.20 Apply the basic principles of biology, physics, and chemistry (properties of matter; structure of compounds; concepts of motion; temperature, pressure and volume; work, power, force and energy; machines; human cell structure).
04.21 Identify problems rooted in basic biology, physics, or chemistry (effects of hazardous materials on health and safety, effects of drugs on health, trouble shooting problems on a machine).

05.0 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--The student will be able to:

05.01 Describe and explain steps in the design/problem-solving process.
05.02 Propose solutions to given problems.
05.03 Design and implement the optimal solution to a given problem.
05.04 Document each step of the design/problem-solving process.
05.05 Demonstrate "brainstorming" as a process to solve problems.
05.06 Define "critical thinking" and its value in the problem-solving process.

06.0 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR COMPLEX INTERRELATIONSHIPS--The student will be able to:

06.01 Demonstrate a knowledge of how social, organizational, and technological systems work.
06.02 Explore methods used to monitor and correct performance of technological systems.
06.03 Design and implement an optimal solution to a given problem.
06.04 Outline major historical technological developments or events.
06.05 Identify recent advances in technology.
06.06 Explain problem-solving roles of technology.
06.07 Forecast a technological development or event.
06.08 Define technology.

07.0 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND ALLOCATE RESOURCES--The student will be able to:

07.01 Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
07.02 Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
07.03 Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
07.04 Display a knowledge of the efficient use of human resources.

08.0 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--The student will be able to:

08.01 Describe individual strengths and weaknesses.
08.02 Discuss individual interests related to a career.
08.03 Identify careers within specific areas of technology.
08.04 Explore careers within specific areas of interest.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

09.01 Conduct a job search.
09.02 Secure information about a career.
09.03 Identify documents which may be required when applying for a job interview.
09.04 Complete a job application form correctly.
09.05 Demonstrate competence in job interview techniques.
09.06 Prepare a resume for a job.

10.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

10.01 Define entrepreneurship.
10.02 Describe the importance of entrepreneurship to the American economy.
10.03 List the advantages and disadvantages of business ownership.
10.04 Identify the risks involved in ownership of a business.
10.05 Identify the necessary personal characteristics of a successful entrepreneur.
10.06 Identify the business skills needed to operate a small business efficiently and effectively.

11.0 MAKE AN INFORMED AND MEANINGFUL CAREER CHOICE--The student will be able to:

11.01 Make a tentative occupational choice based on the information learned and interest developed in this course.
11.02 Review tentative occupational choices based on the information learned and interest developed in this course.

16.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT HYDRAULIC AND PNEUMATIC POWER TECHNOLOGY--The student will be able to:

16.01 Identify and define key terms, categories, and parts of hydraulic and pneumatic power technology.
16.02 Describe the operating theory and principles of hydraulic and pneumatic power technology.
16.03 Explain the uses and applications of hydraulic and pneumatic power systems.
16.04 Identify industries that produce and use hydraulic and pneumatic power systems.
16.05 Describe the energy sources for hydraulic and pneumatic power systems.
16.06 Perform technical skills in building, assembling, maintaining, or operating hydraulic and pneumatic power systems.

17.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ELECTRIC POWER TECHNOLOGY--The student will be able to:

17.01 Identify and define the key terms, categories, and parts of electric power technology.
17.02 Describe the operating theory and principles of electric power systems.
17.03 Explain the uses and applications of electric power systems.

17.04 Identify industries that produce and use electric power systems.
17.05 Describe energy and fuel sources for electric power systems.
17.06 Perform technical skills in building, assembling, maintaining, or operating an electric power system.

18.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT JET ENGINE POWER TECHNOLOGY--The student will be able to:

18.01 Identify and define key terms, categories, and parts of jet engine power technology.
18.02 Describe the operating theory and principles of jet engine power technology.
18.03 Explain the uses and applications of jet engines.
18.04 Identify industries that produce and use jet engines.
18.05 Describe energy and fuel sources for jet engines.
18.06 Perform technical skills in building, assembling, maintaining, or operating jet engines.

19.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ROCKET ENGINE POWER TECHNOLOGY--The student will be able to:

19.01 Identify and define key terms, categories, and parts of rocket engine power technology.
19.02 Describe the operating theory and principles of rocket engine power technology.
19.03 Explain the uses and applications of rocket engines.
19.04 Identify industries that produce and use rocket engines.
19.05 Describe energy and fuel sources for rocket engines.
19.06 Perform technical skills in building, assembling, maintaining, or operating rocket engines.

20.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT SOLAR CELLS AND FUEL CELLS--The student will be able to:

20.01 Identify and define key terms, categories, and parts of solar cell and fuel cell power technology.
20.02 Describe the operating theory and principles of solar cell and fuel cell power technology.
20.03 Explain the uses and applications of solar cell and fuel cell power technology.
20.04 Identify the industries that produce and use solar cell and fuel cell power systems.
20.05 Describe the energy and fuel sources for solar cell and fuel cell power systems.
20.06 Perform technical skills in building, assembling, maintaining, or operating solar cell or fuel cell systems.

21.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT NUCLEAR POWER TECHNOLOGY--The student will be able to:

21.01 Identify and define the key terms, categories, and parts of nuclear power technology.
21.02 Describe the operating theory and principles of nuclear power systems.
21.03 Explain the uses and applications of nuclear power systems.
21.04 Identify industries that produce and use nuclear power systems.

21.05 Describe energy and fuel sources for nuclear power systems.
21.06 Perform technical skills in building, assembling, maintaining, or operating a simulated or real nuclear power system.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8601230
Course Title: Power and Transportation Technology III
Course Credit: 1

COURSE DESCRIPTION: This course provides students with an introduction to the knowledge, human relations, and technical skills of energy and power technology.

01.0 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--The student will be able to:

- 01.01 Select appropriate tools, procedures, and/or equipment needed to produce a product.
- 01.02 Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
- 01.03 Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.
- 01.04 Follow laboratory safety rules and procedures.
- 01.05 Demonstrate good housekeeping at work station within total laboratory.
- 01.06 Identify color-coding safety standards.
- 01.07 Explain fire prevention and safety precautions and practices for extinguishing fires.
- 01.08 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

02.0 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
- 02.02 Participate as a member of a team.
- 02.03 Teach others new skills.
- 02.04 Identify skills needed to serve clients/customers.
- 02.05 Demonstrate leadership skills.
- 02.06 Describe strategies necessary for negotiating agreements.
- 02.07 Demonstrate the application of skills necessary to work with people of diverse backgrounds.
- 02.08 Form an understanding and appreciation for work after listening to or observing technology workers.
- 02.09 Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
- 02.10 Form an understanding and appreciation for the roles and work of co-workers.

03.0 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATIONS--The student will be able to:

- 03.01 Define terms related to computers.

03.02 Identify and describe methods of information acquisition and evaluation.
03.03 Discuss advantages and disadvantages in the application of technologies.
03.04 Produce a plan to organize and maintain information relevant to emerging technologies.
03.05 Comprehend and communicate information relevant to emerging technologies.
03.06 Demonstrate the use of computers to process information.

04.0 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

04.01 Identify and explain the main and subordinate ideas in a written work.
04.02 Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.
04.03 Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.
04.04 Distinguish fact from opinion.
04.05 Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.
04.06 Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.
04.07 Improve one's own writing by restructuring, correcting errors, and rewriting.
04.08 Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.
04.09 Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.
04.10 Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.
04.11 Compose unified and coherent correspondence, directions, descriptions, explanations and reports.
04.12 Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.
04.13 Conceive and develop ideas about a topic for the purpose of speaking to a group; choose and organize related ideas; present them clearly in Standard English; and evaluate similar presentations by others.
04.14 Use the mathematics of:
- integers, fractions, and decimals;
- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.
04.15 Make estimates and approximations, and judge the reasonableness of a result.
04.16 Use elementary concepts of probability and statistics.
04.17 Draw, read, and analyze graphs, charts, and tables.
04.18 Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and field work.

04.19 Organize and communicate the results obtained by observation and experimentation.
04.20 Apply the basic principles of biology, physics, and chemistry (properties of matter; structure of compounds; concepts of motion; temperature, pressure and volume; work, power, force and energy; machines; human cell structure).
04.21 Identify problems rooted in basic biology, physics, or chemistry (effects of hazardous materials on health and safety, effects of drugs on health, trouble shooting problems on a machine).

05.0 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--The student will be able to:

05.01 Describe and explain steps in the design/problem-solving process.
05.02 Propose solutions to given problems.
05.03 Design and implement the optimal solution to a given problem.
05.04 Document each step of the design/problem-solving process.
05.05 Demonstrate "brainstorming" as a process to solve problems.
05.06 Define "critical thinking" and its value in the problem-solving process.

06.0 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR COMPLEX INTERRELATIONSHIPS--The student will be able to:

06.01 Demonstrate a knowledge of how social, organizational, and technological systems work.
06.02 Explore methods used to monitor and correct performance of technological systems.
06.03 Design and implement an optimal solution to a given problem.
06.04 Outline major historical technological developments or events.
06.05 Identify recent advances in technology.
06.06 Explain problem-solving roles of technology.
06.07 Forecast a technological development or event.
06.08 Define technology.

07.0 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND ALLOCATE RESOURCES--The student will be able to:

07.01 Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
07.02 Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
07.03 Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
07.04 Display a knowledge of the efficient use of human resources.

08.0 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--The student will be able to:

08.01 Describe individual strengths and weaknesses.
08.02 Discuss individual interests related to a career.
08.03 Identify careers within specific areas of technology.

08.04 Explore careers within specific areas of interest.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

09.01 Conduct a job search.
09.02 Secure information about a career.
09.03 Identify documents which may be required when applying for a job interview.
09.04 Complete a job application form correctly.
09.05 Demonstrate competence in job interview techniques.
09.06 Prepare a resume for a job.

10.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

10.01 Define entrepreneurship.
10.02 Describe the importance of entrepreneurship to the American economy.
10.03 List the advantages and disadvantages of business ownership.
10.04 Identify the risks involved in ownership of a business.
10.05 Identify the necessary personal characteristics of a successful entrepreneur.
10.06 Identify the business skills needed to operate a small business efficiently and effectively.

11.0 MAKE AN INFORMED AND MEANINGFUL CAREER CHOICE--The student will be able to:

11.01 Make a tentative occupational choice based on the information learned and interest developed in this course.
11.02 Review tentative occupational choices based on the information learned and interest developed in this course.

22.0 PERFORM ADVANCED-STUDY AND TECHNICAL SKILLS RELATED TO ENERGY AND POWER TECHNOLOGY--The student will be able to:

22.01 Select an individual or group project in cooperation with the teacher.
22.02 Develop a written plan of work to carry out the project.
22.03 Show evidence of technical study in support of the project.
22.04 Perform skills related to the project.
22.05 Complete the project as planned.

23.0 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO ENERGY AND POWER--The student will be able to:

23.01 Collect or produce data on energy and power through the operation of a computer.

24.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT POWERED TRANSPORTATION SYSTEMS--The student will be able to:

24.01 Identify and define key terms, categories, and parts of land, water, air, and space transportation systems.
24.02 Describe the theories and operating principles of land, water, air, and space transportation.

24.03 Explain the uses and applications of land, water, air and space transportation vehicles.
24.04 Identify industries that produce and use land, water, air, and space transportation vehicles.
24.05 Describe the energy and power systems used in land, water, air, and space vehicles.
24.06 Perform technical skills in building, assembling, servicing, or operating a complete transportation vehicle.

25.0 MEASURE AND REPORT THE POWER AND EFFICIENCY OF POWER PRODUCING SYSTEMS--The student will be able to:

25.01 Measure the power and efficiency of a mechanical system.
25.02 Measure the power and efficiency of a fluid system.
25.03 Measure the power and efficiency of an electrical system.
25.04 Measure the power and efficiency of a thermal system.

26.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON AN ENERGY AND POWER SYSTEM--The student will be able to:

26.01 Identify a problem.
26.02 State a need to research the problem.
26.03 Form a hypothesis about the problem.
26.04 Plan the procedures for researching the problem.
26.05 Conduct the research following the planned procedures.
26.06 Present the research findings in a seminar.